

## **4.0 Environmental Consequences**

### **4.1 Social and Economic Impacts**

#### **4.1.1 Community Changes**

##### **4.1.1.1 Cohesion**

The two communities of Biggsville and Monmouth are immediately adjacent to existing U.S. Route 34 and, therefore, the cohesion of these communities could be potentially affected by the construction of the preferred alternative. No impacts to community cohesion are anticipated in the communities of Gladstone, Gulfport, and Kirkwood by either the No Action or preferred alternatives.

Existing U.S. Route 34 now separates the primary Biggsville community from Union High School and a residential area which is located to the south. The preferred alternative will minimize this separation with a proposed bypass for Biggsville. Thus, the traffic volumes on the existing U.S. Route 34 will be reduced considerably. The preferred alternative would improve accessibility to services for homes south of existing U.S. Route 34 in the Biggsville area and, therefore, enhance community cohesion by allowing easier access to community services and neighbors. Additionally, the Biggsville community will have improved access to Union High School since the primary through traffic pattern will be south of Biggsville. The bypass of Biggsville will improve public safety as truck traffic and total traffic volumes are reduced on the existing portion of the U.S. Route 34 roadway through Biggsville.

The condition created by the bypass will eliminate traffic conflicts between local and through traffic movements, potentially increase safety relative to turning movements on the roadway, and allow for safer, potentially more frequent interaction across the roadway. The preferred alternative will not cause any disruptions to existing neighborhoods, and overall noise levels would be expected to become lower as a result of decreased traffic volumes and speeds. Two township roads associated with the proposed bypass are planned to be closed east and west of Union High School, TR122 and TR102. Due to those proposed road closures, vehicular traffic would be diverted to Illinois Route 94/116 to access Union High School from the south. This change in travel pattern would slightly increase the travel distance to Biggsville (see Appendix C, Exhibit 1, Sheets 15a, 15b, and 16).

In Monmouth, the preferred alternative will improve public safety via realignment of entrances and/or closure of commercial entrances; however, no changes in community activities, use of facilities, or neighborhood cohesion is expected. Specifically, in the area of Harlem Avenue, Sunset Road will be relocated to intersect with 62nd Street and cul-de-sac at Harlem Avenue. This change will modify the travel pattern of the existing residential development but will improve the safety to motorists in this area.

Road closures of two township roads, TR122 and TR102, are planned for the preferred alternative in Henderson County; no road closures of township roads are planned in Warren County.

#### 4.1.1.2 Public Services and Facilities

The No Action alternative will have no effect on public services and facilities. One benefit associated with the preferred alternative is improved accessibility of Union High School and public facilities in Biggsville. The preferred alternative of U.S. Route 34 will be located approximately 500 m (1,640 ft) south of the existing U.S. Route 34 and south of Union High School. The entrance to Union High School will remain on existing U.S. Route 34 and Illinois Route 94. Access will be cut off at TR102 and new U.S. Route 34. Therefore, traffic will be diverted from TR102 south of the new U.S. Route 34 to Route 94/116 (see Appendix C, Exhibit 1, Sheets 14, 15a, and 15b).

The preferred alternative will substantially decrease through traffic on existing U.S. Route 34 which is anticipated to create a safer intersection near the high school. Also, all of the public facilities in Biggsville are located north of the existing U.S. Route 34, and these facilities will have improved and safer access to the residential areas south of existing U.S. Route 34.

The preferred alternative will have no impact on fire, police, ambulance service, church, and schools serving the communities of Gladstone, Kirkwood, or Monmouth. Access to the preferred alternative will not be restricted on major thoroughfares near the communities. Public services will be maintained during construction, and the existing lanes will remain open during construction.

#### 4.1.1.3 Displacements

The No Action alternative would not displace any non-farm residences, farm residences, or other accessory buildings. The residential and commercial displacements for the preferred alternative are depicted on Exhibit 1 in Appendix C.

The preferred alternative will displace commercial and non-farm and farm residences in Henderson County but only farm residences in Warren County (Table 4-1).

Table 4-1. Displacements

Dwelling Type	Quantity of Structures Displaced	
	Henderson County	Warren County
Commercial	1	0
Non-Farm Residences	3	0
Farm Residences	4	3
Farm Buildings*	5	9

\* All non-residential farm structures.

The commercial building that would be displaced by the preferred alternative is the gas station/mini-mart located at the Carman Road intersection (Appendix C, Exhibit 1, Sheet 1a). The four farm residences and three non-farm residences that would be displaced by the preferred alternative in Henderson County are primarily located in two clusters, with two residences just east of Gulfport (Appendix C, Exhibit 1, Sheets 1a and 2) and four residences east of Biggsville (Appendix C, Exhibit 1, Sheets 21-24). One residence will also be removed near Bogus Hollow Road (Appendix C, Exhibit 1, Sheet 11). In addition, five accessory farm buildings will also be removed (Appendix C, Exhibit 1, Sheets 13, 21, 22, 23, and 24). The five displaced structures include all non-residential farm structures such as farm business buildings, barns, sheds, and garages.

In Warren County there are no non-farm residential displacements; however, three farm residences will be removed (see Appendix C, Exhibit 1, Sheets 32, 33, and 35). In addition, nine accessory buildings will be taken. The farm residences are located between Kirkwood and Monmouth where the preferred alternative represents a shift in existing U.S. Route 34. All displacements will occur within

the proposed right-of-way except for one residence where there is no feasible access to the preferred alternative.

Approximately 15 residents (0.19 percent of the county population) in Henderson County and 8 residents (0.04 percent of the county population) in Warren County will require relocation as a result of the displacements resulting from the preferred alternative (Census of Population and Housing, 1990). The small number of residents displaced is not expected to affect county-wide travel patterns, housing patterns, or public facility services.

The homeowner vacancy rates are 1.6 and 2.5 percent in Henderson and Warren Counties, respectively (Selected Population and Housing Characteristic, U.S. Department of Commerce, 1990 Census). There should be adequate relocation opportunities to accommodate all residential displacements; however, the proximity to current locations may vary as some of the residences to be displaced occur in sparsely populated areas. According to Young & Govern Farm Realty in Monmouth, an adequate supply of properties is on the marketplace in Henderson and Warren Counties.

The IDOT, under provisions of the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, and Section 3-107.1 and 4-511 of Chapter 121 (the Illinois Highway Code) of the Illinois Revised Statutes, will provide relocation assistance to all eligible persons relocated as a result of a highway project.

It is the policy of the State of Illinois to guarantee that displaced persons receive a fair and equitable treatment, and do not experience hardships as a result of a highway project designed to benefit the public. Any person, family, or business displaced by a highway project shall be offered relocation assistance services for locating suitable replacement property. Relocation payments and advisory assistance are offered in addition to the State's payments for real property.

The Uniform Relocation and Real Property Acquisition Act of 1970, as amended, applies to all federal or federally assisted activities that involve the acquisition of real property or the displacement of persons. Just and fair compensation is provided for each property which must be acquired for right-of-way, as required by both the United States and Illinois Constitutions. Just compensation, or monetary payment (equivalent to the "fair market value" of the property) will be provided to each displaced person, family, or business owner. Fair market value is defined as "the highest price estimated in terms of money which the property will bring if exposed to sale on the open market with a reasonable time allowed to find a buyer, buying with the knowledge of all the uses to which it is adapted, and for which it is capable of being used."

IDOT will be responsible for determining the availability of adequate housing in the area for relocatees before any federally funded project can be approved. A "Relocation Plan" will be prepared to document the availability and cost of relocation sites and planned remuneration. Additional or unusual circumstances may warrant other mitigation measures on a case-by-case basis.

#### **4.1.1.4 Environmental Justice**

The FHWA Order 6640.23 establishes policies and procedures to use in complying with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. The project area was evaluated in accordance with these procedures to determine if there is a potential for disproportionate and adverse impacts to low-income or minority populations. Using U.S. Census data, the Health and Human Services Poverty Guidelines (Federal Register, February 2000), and field observations, it was determined that no low-income or minority

populations will have disproportionate adverse affects from the proposed project. None of the relocations involve minority or low income populations.

#### 4.1.2 Economic Impacts

The No Action alternative will not displace any businesses or require the purchase of portions of business properties for right-of-way acquisition needs within the project corridor. The preferred alternative will require the acquisition of the gasoline service station located north of U.S. Route 34 at the Carman Road interchange (see Appendix C, Exhibit I, Sheet 1a). If this traffic dependent business is eliminated at this location, the business could relocate to re-establish business. If the service station is not relocated, then the employees will become displaced and sales tax revenue will be reduced. Agricultural impacts are addressed in Section 4.3. No farm businesses will be displaced as a result of the preferred alternative. Some farm structures that are part of four farm businesses will be displaced.

The proposed bypass of Biggsville may be beneficial to the cohesion and public service of the community; however, there may be adverse economic impacts to specific businesses sensitive to proximity to the roadway. Ray's Country Fun, the Phillips service station, the Feed Store Restaurant, and C&I Enterprises located on existing U.S. Route 34 are dependent on traffic volumes and high visibility. There will still be access to these businesses via Illinois Route 94; however, these three businesses may experience reduced revenue. These traffic-oriented businesses will need to overcome any reduced revenue losses by increased advertising, changing business practices, or relocating.

Other businesses in Biggsville that are not located adjacent to the existing facility include the First State Bank of Biggsville, Crop Production Services, West Central Diesel Service, grain elevators, construction offices, and other retail businesses. None of these businesses are expected to lose revenue when the bypass is constructed as their businesses are associated with localized customers. Any of the traffic-dependent businesses could relocate toward the preferred alternative; however, this would not adversely impact the other existing businesses.

The construction of the proposed project may produce limited growth and promote some market opportunities for traffic dependent businesses such as gas stations or convenience stores, especially at interchanges. Existing retail businesses may relocate to vacant land adjacent to the preferred alternative for improved access.

As part of the preferred alternative, there are proposed improvements to U.S. Route 34 in the Monmouth area. These improvements include the relocation of driveways, realignment of entrances, or elimination of multiple entrances to provide improved egress for businesses where realignment occurs. The areas where entrance improvements will improve public safety and provide better traffic patterns for those accessing businesses are summarized on Table 4-2. Even with a reduced number of entrances, none of these improvements will impact the business revenues or operations of these commercial facilities.

Table 4-2. Businesses with Entrance Modifications to U.S. Route 34

Location	Business
Broadway Avenue east of U.S. Route 34	CMS Tire Service
Main Street south of U.S. Route 34	McDonald's and Burger King
6th Street north of U.S. Route 34	Shopco Development and City Lincoln Mercury
6th Street south of U.S. Route 34	Eagle Food Store, Super 8 Motel, and Cavanaugh Dodge

#### **4.1.2.1 Employment**

The No Action alternative will have no effect on employment. The preferred alternative will create construction-related jobs for both farm and non-farm persons. However, up to 15 employees may lose employment in Henderson County at the service station/convenience store located at the Carman Road intersection. Direct (primary) employment is defined as onsite construction jobs while indirect (secondary) refers to offsite jobs related to the manufacture or sale of project materials or input. Positive economic effects may be realized during the construction period due to the expenditure of public funds within the project area. This includes direct income for construction workers which may be expended for goods and services within the area. In addition, local materials suppliers may benefit from providing goods to the construction contractor for the project. The level at which these positive impacts will occur is determined to a great degree by the contractor based upon the extent that local labor and materials are used in the construction project.

#### **4.1.2.2 Tax Revenue**

The No Action alternative will have no effect on tax revenue. Construction of the preferred alternative will result in a loss of local tax revenue since both land and structures will be required for the right-of-way and interchange improvements. The value of displaced structures was based upon median assessed values for one commercial facility, non-farm residences, farm residences, and farm buildings obtained from the Henderson County and Warren County tax assessors' offices. The assessed value of displaced land, not including structures, was estimated on an acre basis using 1998 assessments for agricultural land in Warren and Henderson Counties. The assessed value of land per acre was then multiplied by the total land area needed to accommodate the proposed right-of-way.

The combined assessed value of lost land and structures was used to determine the tax revenue loss for each taxing district. The tax revenue loss for Henderson and Warren Counties are summarized on Tables 4-3 and 4-4, respectively. The tax revenue loss typically was less than 2.5 percent for each taxing district in Henderson and Warren Counties. The cumulative impact on tax base of each county within the townships affected will average about 0.98 percent for Henderson County and average about 0.23 percent for Warren County. The greatest impacts will occur to the Tompkins Township, Tompkins Road and Bridge, Biggsville Township, Gladstone Township, Gladstone Township Assessor, and the Gladstone-Gulf Fire Prevention District.

The lost tax revenues may be recovered by increases in taxing rates or possibly be offset by the reconstruction of homes by the displaced homeowners. Property tax and other revenues (such as sales tax), fees generated from business activity, and new development enhanced by the construction of the preferred alternative may offset the nominal loss of real estate tax revenues.

New development resulting from improved accessibility provided by the project may be added to the tax rolls. This could result in an increase in assessed evaluation because of new development, and an overall increase in the total taxes collected. Also, an increase in tax revenues may result from an increase in property values due to improved access provided by the preferred alternative.

Table 4-3. Tax Revenue Loss Analysis for Henderson County, Illinois

Taxing Unit	Additional Right-of-way		Equalized Assessed Valuation of Land <sup>3</sup>	Assessed Value of Structures <sup>4</sup>	Tax Rate <sup>5</sup>	Approximate Revenue Lost in 1998 \$'s <sup>6</sup>	1998 Total Assessed Taxes in 1999 \$'s <sup>7</sup>	% Tax Loss <sup>8</sup>
	Hectares <sup>1</sup>	Acres <sup>2</sup>						
Henderson County	233.9	577.5	\$99,562.64	\$147,372.68	1.0705	\$2,643.44	\$949,579.30	0.2784%
Henderson County Ambulance	233.9	577.5	\$99,562.64	\$147,372.68	0.0379	\$93.59	\$30,062.92	0.3133%
Gladstone-Gulf Fire Prevention District	233.9	577.5	\$99,562.64	\$147,372.68	0.4623	\$1,141.58	\$62,569.54	1.8245%
Carl Sandburg College	233.9	577.5	\$99,562.64	\$147,372.68	0.4601	\$1,136.15	\$400,804.72	0.2835%
City Library	233.9	577.5	\$99,562.64	\$147,372.68	0.1560	\$385.22	\$138,378.94	0.2784%
Unit School #115	233.9	577.5	\$99,562.64	\$147,372.68	4.5292	\$11,184.19	\$1,909,576.12	0.5857%
Carman Township	2.5	6.2	\$563.77	\$0.00	0.4779	\$2.69	\$15,524.30	0.0174%
Carman Multi-Township Assessor	2.5	6.2	\$563.77	\$0.00	0.0319	\$0.18	\$4,087.10	0.0044%
Biggsville Township	94.9	234.3	\$56,051.59	\$86,962.38	0.8152	\$1,165.85	\$73,835.58	1.5790%
Biggsville Multi-Township Assessor	94.9	234.3	\$56,051.59	\$86,962.38	0.0219	\$31.32	\$4,417.52	0.7090%
Gladstone Township	136.5	337	\$42,947.28	\$60,410.30	0.5257	\$543.35	\$75,268.68	0.7219%
Gladstone Township Assessor	136.5	337	\$42,947.28	\$60,410.30	0.0130	\$13.44	\$1,861.16	0.7219%

1 Net right-of-way required for construction in hectares.

5 Dollars per \$100 of assessed valuation.

2 Net right-of-way required for construction in acres.

6  $\frac{\text{E.A.V. of Land} + \text{Assessed market value of structure}}{100} \times 1998 \text{ tax rate}$ 3 Right-of-way multiplied by \$ per acre land / .405 hectares for Henderson County)  
\$90.93 per acre farmland (Carman) \$239.23 per acre farmland  
(Biggsville) \$127.44 per acre farmland (Gladstone)

7 Total assessed property tax for 1998.

4 Total Assessed Value \$\$ for structures within right-of-way to be acquired:  
Biggsville: \$12,849.94/residence; \$21,920.27/farm house; \$5,807.32/farm building  
Gladstone: \$14,452.47/residence; \$22,416.02/farm house; \$5,189.38/farm building

8 Percent of revenues lost from highway construction.

Source: Final Abstract of 1998 Assessments: Henderson County, Illinois

Table 4-4. Tax Revenue Loss Analysis for Warren County, Illinois

Taxing Unit	Additional Right-of-way		Equalized Assessed Valuation of Land <sup>3</sup>	Assessed Value of Structures <sup>4</sup>	Tax Rate <sup>5</sup>	Approximate Revenue Lost in 1998 \$'s <sup>6</sup>	1998 Total Assessed Taxes in 1999 \$'s <sup>7</sup>	% Tax Loss <sup>8</sup>
	Hectares <sup>1</sup>	Acres <sup>2</sup>						
Warren County	142.0	350.5	\$115,160.57	\$67,043.76	0.5806	\$1,057.88	\$1,157,656.35	0.0914%
Warren County Highway	142.0	350.5	\$115,160.57	\$67,043.76	0.2000	\$364.41	\$398,779.32	0.0914%
Monmouth Township	5.2	12.8	\$3,021.06	\$0.00	0.1857	\$5.61	\$107,039.38	0.0052%
Tompkins Township	102.7	253.5	\$82,846.34	\$67,043.76	0.4817	\$722.02	\$59,835.11	1.2067%
Lenox Township	34.1	84.2	\$29,293.18	\$0.00	0.4490	\$131.53	\$48,513.96	0.2711%
Lenox Road and Bridge	34.1	84.2	\$29,293.18	\$0.00	0.6746	\$197.61	\$72,889.79	0.2711%
Tompkins Road and Bridge	102.7	253.5	\$82,846.34	\$67,043.76	0.3548	\$531.81	\$44,072.04	1.2067%
Monmouth Road and Bridge	5.2	12.8	\$3,021.06	\$0.00	0.1979	\$5.98	\$114,071.58	0.0052%
Central Warren Fire Protection District	142.0	350.5	\$115,160.57	\$67,043.76	0.1129	\$205.71	\$51,712.70	0.3978%
Jr. College 518	142.0	350.5	\$115,160.57	\$67,043.76	0.4601	\$838.32	\$917,391.81	0.0914%
Ambulance	142.0	350.5	\$115,160.57	\$67,043.76	0.0837	\$152.51	\$96,005.71	0.1588%
Library	142.0	350.5	\$115,160.57	\$67,043.76	0.1902	\$346.55	\$382,912.39	0.0905%
U222 Unit School Out City in CWFPD in Ambulance	142.0	350.5	\$115,160.57	\$67,043.76	3.9464	\$7,190.51	\$1,682,223.58	0.4274%

1 Net right-of-way required for construction in hectares.

5 Dollars per \$100 of assessed valuation.

2 Net right-of-way required for construction in acres.

6  $\frac{\text{E.A.V. of Land} + \text{Assessed value of structure}}{100} * 1998 \text{ tax rate}$ 3 Right-of-way multiplied by \$per acre land / .405 hectares for Warren County)  
\$347.90 /acre farmland (Lenox) \$326.81/acre farmland  
(Tompkins) \$236.02/acre farmland (Monmouth)

7 Total assessed property tax for 1998.

4 Total Assessed Value \$\$ for structures within right-of-way to be acquired in  
Tompkins Township: \$12,691.35 per farm house; \$4,138.53 per farm building

8 Percent of revenues lost from highway construction.

Source: Final Abstract of 1998 Assessments: Warren County, Illinois

#### **4.1.2.3 Property Value**

The No Action alternative will have no effect on property value. Property values will be expected to increase in areas adjacent to the major interchanges and intersections of the preferred alternative. Commercial development and traffic-dependent services may be attracted to these areas. Improved access to the highway may further increase the value of residential and commercial properties.

## **4.2 Land Use Impacts**

### **4.2.1 Anticipated Land Use**

The most obvious change in land use will result from the conversion of the agricultural land use to that of a roadway facility and associated right-of-way. As indicated in Section 3.0, there was recognition of agriculture as the predominant economic and social force during the process of developing and evaluating project alternatives. Agriculture is expected to remain the predominant land use for both the No Action and preferred alternative scenarios. No recreational or park lands will be modified in the project area. There may be additional commercial and industrial development near new interchanges; however, this conversion is expected to be limited in area.

### **4.2.2 Local and Regional Land Use Plans**

The No Action and preferred alternatives are consistent with the land use planning designations of the City of Monmouth as both the No Action and preferred alternative have similar access and do not oppose existing land use plans. No land use plans exist for Henderson or Warren Counties.

## **4.3 Agricultural Impacts**

A detailed analysis of potential agricultural impacts by the preferred alternative is summarized in this section.

As presented in Trends in Farm Operations (Section 2.3.2), the total land in farms has declined along the U.S. Route 34 corridor over time and this trend will likely continue. However, for the quantitative purposes of this document, the discussion will assume that the agricultural lands will be impacted by the preferred alternative for U.S. Route 34 prior to other conversions.

The terms used to discuss agricultural impacts are defined in Table 4-5 and depicted in Figure 4-1.



Table 4-5. Glossary of Terms Used in Agricultural Impact Analysis

Term	Definition
Farm Operation	A farm operation is one or more parcels of land, not necessarily contiguous or under the same ownership, that are farmed as a single operation.
Affected Farm Operation	An affected farm operation is a farm from which right-of-way or easement to construct a proposed highway will be required from the edge or side of the field.
Affected Owner	An individual, partnership, etc. with whom right-of-way negotiations will be necessary. The number of owners can be lower or higher than the number of affected farm operations. Some individuals may own more than one farm affected by highway construction or an operation may have multiple owners.
Farm Operator	An individual, partnership, etc. who has one or both the physical and managerial responsibility of the farm, and may share in the expense and income derived from such property. Farms may have multiple operators.
Operations Affected by Adverse Travel	Farm operations for which the new highway will cause additional travel from one part of the operation to another. For example, elimination of direct access to a field or nearby road may cause additional travel to reach a farmed area.
Adverse Travel	This term is defined as the lengths of additional travel which a farm operator or owner must undertake to get into fields or onto market roads that were once easily accessed. This added travel is typically caused by severance of a farm operation by a new highway or by a road closure, and is calculated to show extra round trip mileage per field visit. (see Figure 4-1). $AT = (CD - AB) \times 2$ Adverse travel equals the old trip distance minus the new trip distance times two. This represents one round trip (see Figure 4-1).
Severed Farm Operation	Severed farm operations occur when a new highway severs the farm either laterally or diagonally, and separates one or more parcels from others within a farm operation, usually resulting in adverse travel and operational difficulties for the farm operator.
Landlocked Parcels	A land-locked parcel is a parcel that is created by the taking of right-of-way for road construction in such a way that it is not accessible by road or easement after construction (see Figure 4-1).
Severance Management Zones	Defined on the basis of acreage, severance management zones are those areas within or adjacent to severed parcels used to measure quantitatively the disruption to normal farming operations. Triangular shapes are the basis of many of the problems caused by diagonal land severance and right-of-way takings that are not square with the farmed acreage. Point rows, caused by angular field ends; harvest losses due to excessive turning and overlapping application of herbicides are problems leading to waste, additional expense, increased field work time, and additional usage of fuel (energy consumption) (see Figure 4-1).
Point Rows	This is a physical condition found in row crop operations when rows of grain in the field intersect rows at the end of the field in a skewed fashion rather than at a perpendicular or right angle. This condition is accounted for in the 'severance management acres' calculation (see Figure 4-1).
Uneconomical Remnants	Uneconomical remnants are severed portions or landlocked portions of a farm tract less than 2 ha (5 ac) in size that will be created when new right-of-way traverses the property.
Agriculture Income Loss	To estimate the agricultural income loss of right-of-way taken, the total number of farm acres in each county is divided into the total farm receipts in the most recent year available from the Illinois Agricultural Statistics Summary. In order to obtain an average annual agricultural income loss for the project involved, the per acre loss is multiplied by the total right-of-way being taken, and is shown as the Annual Agricultural Loss.

### 4.3.1 Summary of Agricultural Impact

The No Action alternative will not impact any agricultural land. When a proposed roadway crosses existing farmland, agricultural land and operations are affected. Potential impacts include agricultural land conversion to highway right-of-way, severed farm operations, otherwise affected farms, severance management zone (SMZs), adverse travel, landlocked parcels, farm resident and farm building displacements, uneconomical remnants, and agricultural income loss. The potential agricultural impacts for the preferred alternative are summarized on Table 4-6.

Table 4-6. Summary of Potential Agricultural Impacts Associated with the Preferred Alternative

	Henderson County	Warren County	Total
Number of Severed Farm Operations (by tract)	26	2	28
Number of Otherwise Affected Farm Operations (by tract)	23	26	49
Total Number of Affected Farms	43	27	70*
Number of Owners Affected	56	39	95
Number of Operators Affected	43	28	71
Number of Farms Affected by Adverse Travel (by tract)	8	1	9
SMZ			
Ha (ac)	148 (366)	11 (26)	159 (392)
Number	103	21	124
Adverse Travel # km (mi) per trip	14.9 (9.2)	3.0 (1.9)	17.9 (11.1)
Number of Landlocked Parcels	2	0	2
Number of Uneconomical Remnants	19	4	23
Prime Farmland, ha (ac)	†	†	191 (471)
Statewide and Local Important Farmland, ha (ac)	†	†	23.5 (58)
Other Farmland, ha (ac)	†	†	59.4 (147.9)
Total Agricultural Land Required for Preferred Alternative, ha (ac)	213.5(527.4)	60.5(149.5)	273.9 (676.9)
Farmstead Displacement			
Total Affected	4	3	7
Houses Displaced	4	3	7
Other Buildings Displaced**	2	8	10
Farm Businesses Affected			
Total Affected	3	1	4
Structures Displaced	3	1	4

\* The total number of affected farms will not equal the sum of severed farm operations by tract and otherwise affected farm operations by tract because farm operations may consist of multiple tracts.

† Prime Farmland, Statewide and Local Important Farmland, and Other Farmland were not delineated per county.

\*\* Garages, barns, sheds.

Currently, the proposed right-of-way for the preferred alternative is either under agricultural production, part of a farmstead or considered residential area or existing right-of-way. The total farmland required for the preferred alternative is 274 ha (677 ac) which would include productive land, pasture, woodland, and buildings. One Centennial Farm and two Conservation Reserve Program (CRP) lands will be impacted by the preferred alternative (see Sections 4.3.4 and 4.3.5). No Agricultural Conservation and Protection Areas will be impacted as a result of the preferred alternative. Over 98 percent of the right-of-way acquisition will affect productive agricultural lands.

### 4.3.2 Prime and Important Farmland Requirements

The acres of prime farmlands that will be converted as a result of the preferred alternative are summarized in Table 4-6. In a letter dated December 4, 2001, the NRCS determined that approximately 191 ha (471 ac) or 70 percent of the total area being converted is prime farmland (Appendix B). The prime

farmland areas occur throughout the project area and are representative of the distribution of prime farmland in Henderson and Warren Counties.

#### **4.3.3 Statewide Important Farmland Requirements**

In a letter dated December 4, 2001, the NRCS determined that approximately 23.5 ha (58 ac) of statewide or locally important farmland will be converted with implementation of the preferred alternative (Appendix B). No farmland in Illinois is classified as “Unique”.

#### **4.3.4 Centennial Farmland Requirements**

A Centennial Farm is located at NW 1/4 Section 19, Township 10N, Range 3W, which is on the south side of U.S. Route 34 and east of the Henderson-Warren County line (Appendix C, Exhibit 1, Sheet 25) and is impacted by the preferred alternative. The farm is 63 ha (167 ac), of which 0.09 ha (0.23 ac) will be impacted.

#### **4.3.5 Conservation Reserve Program Land Requirements**

Based on review of the Farm Service Agency tract maps, which includes CRP lands, there are potentially two CRP lands in Henderson County potentially affected by the preferred alternative. One is located west of TR138 (1600E) and south of existing U.S. Route 34 (Appendix C, Exhibit 1, Sheet 16), but is crossed by the preferred alternative for the Biggsville bypass. It is estimated this CRP land is approximately 8.8 ha (22 ac), of which 1.7 ha (4.2 ac) will be impacted. The second CRP is located west of TR178 (1900E) and south of existing U.S. Route 34 (Appendix C, Exhibit 1, Sheet 19). It is estimated that this CRP land is 2.7 ha (6.6 ac), of which 1.3 ha (3.1 ac) will be impacted by the preferred alternative. There are no CRP lands impacted in Warren County.

#### **4.3.6 Highly Erodible Soils**

Highly erodible soils located within the preferred alternative right-of-way include Class III to Class VII soils that fall within slope classes C to G. There are no soils in Illinois with slopes greater than G slope. There are no soils within the right-of-way that are designated Class VIII. Soils are further subdivided into subclass e, subclass s, and subclass w. Subclass e is defined as soils with the risk of erosion, subclass s is defined as soils that are shallow, draughty, or stoney, and subclass w is defined as those soils with water in or on the soil that interferes with plant growth or cultivation (USDA, 1961).

Approximately 41 ha (102 ac) of highly erodible soils are located within the proposed right-of-way of the preferred alternative in Henderson County (Table 4-7). This includes 27 ha (66 ac) of Class III soils, 6 ha (15 ac) of Class IV soils, 6 ha (16 ac) of Class VI soils, and 2 ha (5 ac) of class VII soils. These soil classes are associated with steep-sloped areas and intermittent drainage ways in the following locations:

- South of Henderson County Conservation Area
- Bogus Hollow Road area
- West of TR94
- West of TR138
- East and West of TR 178
- East and West of TR 198

Table 4-7. Affected Land Capability Groupings, U.S. Route 34\*

Land Capability Class	Henderson County, ha (ac)	Warren County, ha (ac)	Total, ha (ac)
I	94.4 (233.2)	17.0 (42.1)	111.4 (275.3)
II			
subclass II e	14.9 (36.7)	16.1 (39.8)	31 (76.5)
subclass II w	61.7 (152.4)	14.1 (34.9)	75.8 (187.3)
subclass II, s	1.4 (3.5)	NA	1.4 (3.5)
III			
subclass III e	25.9 (64)	10.0 (24.7)	35.9 (88.7)
subclass III w	NA	0.9 (2.2)	0.9 (2.2)
subclass III s	0.7 (1.8)	NA	0.7 (1.8)
IV			
subclass IV e	6.0 (14.8)	1.8 (4.5)	7.8 (19.3)
V	NA	NA	NA
VI			
subclass VI e	6.5 (16)	0.5 (1.3)	7.0 (17.3)
VII			
subclass s	2.0 (4.9)	NA	2.0 (4.9)
VII	NA	NA	NA
VIII	NA	NA	NA
Total	213.5 (527.3)	60.4 (149.5)	273.9 (676.8)

NA = not applicable.

\* Appendix D contains a listing by soil type of the proposed right-of-way required.

Approximately 13 ha (33 ac) of highly erodible soils are located within the proposed right-of-way of the preferred alternative in Warren County (see Table 4-7). This includes 10 ha (25 ac) of Class III soils, 1.8 ha (4.5 ac) of Class IV soils, and 0.5 ha (1.3 ac) of Class VI soils. These soil classes are associated with steep-sloped areas and intermittent drainage ways to the south and east of Kirkwood.

Erosion control measures for highly erodible soils will consist of either vegetative soil stabilization or non-vegetative soil stabilization. Vegetative soil stabilization includes temporary seeding, permanent seeding, sodding, ground cover, or dormant seeding. Non-vegetative soil stabilization includes mulching and aggregate cover.

Perimeter silt fencing and ditch checks will be used to protect adjacent properties during construction. Non-intrusion fencing will also be used in any active pastures to divert livestock from the affected area. Diversion of “clear” water flowing through the construction site away from disturbed areas will be achieved by standard temporary diversion methodologies including ridge diversions (berms and dikes), and diversion swale/excavated type diversion.

#### 4.3.7 Land Evaluation and Site Assessment (LESA) System

“The IDOA and the USDA use the LESA System to assess the viability of agricultural land for continued agricultural production when such land may be impacted by state and federal projects. The results of the LESA evaluation are provided on the USDA’s “Farmland Conversion Impact Rating,” Form AD-1006. The NRCS evaluates the quality (productivity) of the soils that will be impacted,

while the IDOA rates site-specific factors, including the amount of agricultural land required, the proximity of the land to be acquired to existing highway right-of-way, off-site land required for borrow materials and wetland mitigation, creation of (a) severed parcels, (b) uneconomical remnants, (c) landlocked parcels, and (d) adverse travel, relocations of rural residences and farm buildings, and whether highway design standards will be utilized that minimize impacts to agricultural land. The cumulative results of the LESA analysis for the preferred alternatives are shown on Table 4-8. LESA scores of 0-175 points indicate a low rating for protection, 176-225 points indicate a moderate rating for protection (one build alternative should be considered), and scores of 226-300 indicate the land should be retained for agricultural use and an alternative alignment should be utilized. The higher the LESA score, the more viable the farmland is for long-term agricultural use.

Table 4-8. LESA\* Analysis Scores for U.S. Route 34 Preferred Alternative

Preferred Alternative	
Land Evaluation	123
Site Assessment	
Total LESA Score	

\* See Appendix B (B-9), State Soil Scientist, USDA-NRCS, Form AD-1006.

#### 4.3.8 Affected Farm Operations

Potential impacts associated with the preferred alternative, including residential and agricultural business displacements, number of owners and operators affected, number of severed farm operations, number of otherwise affected farm operations, total adverse travel mileage, landlocked parcels, and total uneconomical remnants are summarized in Table 4-6. In Henderson County, due to two major alignment shifts, the number of severed farms, farms with adverse travel, and SMZs, are greater than in Warren County. In addition, two landlocked parcels are associated with the preferred alternative in Henderson County. There are no landlocked parcels in Warren County.

SMZs and severed farms are concentrated in two areas of Henderson County. From the CH15 (900E) east to the Illinois Route 164 interchange located just south of Gladstone, the preferred alternative has a diagonal route on new alignment west of existing U.S. Route 34. SMZs are also associated with the western and eastern portions of the Biggsville bypass.

Approximately 10 percent of all farms located in Henderson County will be affected by the preferred alternative. This includes four farmsteads where houses will be displaced. Approximately 213 ha (527 ac) out of a total farm acreage of 81,822 ha (202,186 ac) or 0.3 percent in Henderson County will be impacted by the preferred alternative.

Approximately 4 percent of all farms located in Warren County will be impacted by the preferred alternative. In Warren County most of the right-of-way acquisition is parallel to existing U.S. Route 34. That reduces the number of severed farms to two and reduces operational impacts such as adverse travel. Approximately 60.5 ha (149.5 ac) out of a total farm acreage of 127,503 ha (315,067 ac) or 0.05 percent of the total farm acreage in Warren County will be impacted by the preferred alternative.

Cropland is tilled more efficiently if the field is square or rectangular. SMZs are triangular shaped areas created by the diagonal intersection of the proposed alignment. These areas are difficult for the operator to farm efficiently since the farmer is compelled to turn his tractor and implements in a

manner which may damage or remove plants and also may lead to the over-application of farm chemicals by overlapping rows. If the disruption is severe enough, a farmer may change from row crops to pasture for this area. Numerous SMZs were identified and calculated in the following areas:

- between CH15 (900E) east to the Illinois Route 164 interchange located just south of Gladstone;
- from TR111 east to the proposed Illinois Route 94/116 intersection located south of the Union High School; and
- between the Warren County line east to TR26.

Adverse travel was estimated for farm operations where additional travel is required due to the preferred alternative. Adverse travel is approximately 14.9 km (9.2 mi) for Henderson County and 3 km (1.9 mi) for Warren County, affecting eight farms and one farm, respectively.

Twenty-three uneconomical remnants constituting 18.6 ha (45.9 ac) were identified in association with the preferred alternative. Nineteen uneconomical remnants are located in Henderson County totaling 15.3 ha (37.8 ac). Two uneconomical remnants are located north of the Carmen Road/U.S. Route 34 intersection. Three are located at CH15 (CH15/900E). Two uneconomical remnants are just north of TR127 and three uneconomical remnants are located southwest of Gladstone Lake. Three are located near Illinois Route 164 just south of Gladstone. Three uneconomical remnants are located just east of Bogus Hollow Road at TR94. The remaining three uneconomical remnants in Henderson County are located south and east of Biggsville.

Four uneconomical remnants are located in Warren County totaling 3.3 ha (8.1 ac). Two are located south of Kirkwood at 20<sup>th</sup> Street. The other two uneconomical remnants are located southwest of Monmouth at 50<sup>th</sup> Street and 60<sup>th</sup> Street.

Two landlocked parcels are associated with the preferred alternative. Both landlocked parcels occur in Henderson County. One landlocked parcel totaling 4.6 ha (11.4 ac) is located south of Gladstone Lake on the east side of U.S. Route 34 (Appendix C, Exhibit 1, Sheet 7). The second landlocked parcel totaling 5.71 ha (14.1 ac) is located just south of Union School on the west side of Illinois Route 94/116 (Appendix C, Exhibit 1, Sheet 15a and b). Both landlocked parcels are used for row crops and contain prime farmland. Neither landlocked parcel contains soil of statewide importance.

Both landlocked parcels were evaluated for the size and cost of the parcel; length of right-of-way required; cost of the required access road; adverse travel distance; and impact to agricultural land. To provide access to the landlocked parcels, new access roads and additional right-of-way would be required. This would in turn require the conversion of additional agricultural land. Providing access would also result in adverse travel for the current farm operator/owner.

To provide access to the landlocked parcel south of Gladstone Lake, a service road approximately 575 m (0.36 mi) would be required at a cost of \$110,500. The parcel is estimated at \$28,500. To provide access to the landlocked parcel just south of Union School, a service road with a culvert approximately 450 m (0.28 mi) in length at a cost of \$101,500 would be required. The parcel is estimated at \$35,300. For these two areas, an access road would not be prudent as the cost and impacts of the service road outweigh the cost of the landlocked parcel. Both landlocked parcels could be considered for borrow areas and/or other mitigative measures (i.e., tree mitigation) for the proposed project.

Farm business impacts are defined as impacted farm accessory buildings (i.e., barn, shed, silo, etc.) that are not associated with a farm residence. Five farm accessory buildings will be impacted on three separate farm business operations in Henderson County. One farm accessory building will be impacted on one farm business operation in Warren County.

#### **4.3.9 Measures to Minimize Impacts to Agriculture**

The project corridor is characterized predominantly by agriculture. Although the study alternate development and evaluation process minimized impacts to agricultural land, it is not feasible to locate a rural highway corridor that will not, to some extent, adversely affect farming operations or prime and important farmlands. The following management and design practices have been incorporated into the project to help minimize disruptions to agricultural activities and residences, as well as help limit adverse effects to designated soils:

- Maximum utilization of existing right-of-way to every extent practicable. Design standards utilized have minimized right-of-way requirements.
- Paralleling property lines to the greatest extent possible. This decreased the number of SMZs, severed farms and farm operations, and landlocked parcels.
- Partial access control design decreased adverse travel, landlocked parcels, and the amount of land necessary for frontage (or access) roads.
- Construction of field access points and at-grade crossings for farm machinery, where deemed practical.
- Widening field entrances at the request of the Illinois Farm Bureau, to allow room for semi-trucks to enter and exit from the fields.
- Maintenance of existing surface and subsurface drainage.
- Informational meetings with IDOA, local agricultural agencies and the Illinois Farm Bureau to obtain firsthand knowledge and awareness of impacts, both favorable and unfavorable to agriculture.
- Proper control of sedimentation and erosion to minimize loss of topsoil into streams and roadside ditches, as well as from adjacent fields.
- During construction, field tiles draining to or intersected by the highway right-of-way will be located by means of trenching and the associated drainage will be accommodated to assure that proper field drainage is maintained.
- Uneconomical remnants acquired and landlocked parcels will be considered when choosing borrow pit locations.
- Uneconomical remnants acquired and landlocked parcels will be utilized as necessary for tree replacement. No additional right-of-way will be purchased for the sole purpose of tree mitigation or floodplain storage.
- Wetland impacts will be mitigated at an existing wetland bank.

#### **4.3.10 Agency Coordination**

Three agricultural coordination meetings were held during the alternate development process. The first meeting occurred on March 25, 1997 at the Farm Bureau. The second meeting occurred on October 26, 1998 to discuss project progress, alternate evaluation process, and issues of concern related to the proposed project. More specifically, the meeting addressed agricultural criteria used in the alternate evaluation process and agency concerns regarding potential effects to agricultural resources in the project corridor.

The third meeting was held on April 16, 1999 and discussed the development and evaluation of the final alternates and the potential effects of proposed alternates on agricultural resources.

#### **4.3.11 Annual Average Agricultural Income Loss**

The average annual agricultural income lost as a result of the preferred alternative was calculated for Henderson and Warren Counties using total farm receipts, total farm acreage, and total project right-of-way acreage in each county. An annual average of \$217,310 in agricultural income is anticipated to be lost in Henderson County as a result of the project. An annual average of \$175,104 in agricultural income is anticipated to be lost in Warren County as a result of the project.

### **4.4 Cultural Resources**

As indicated in Section 2.4.3 Archaeological Resources, cultural resources surveys conducted within the corridor area have recorded numerous prehistoric and historic sites. An intensive pedestrian survey of the preferred alternative began in the Spring of 2000 resulting in the discovery of 38 archaeological sites, several of which will require subsurface evaluation should they be impacted by the final highway alignment. The prehistoric sites located along the preferred alternative are habitation sites ranging in size from overnight encampments to small villages. All mounds and cemeteries will be avoided by the preferred alignment. All of the sites that merit further evaluation have potential National Register significance due to the data that they may yield concerning prehistoric life-ways in this region of Illinois (Criterion D). No archaeological sites historically associated with federally recognized Native American tribes were found within the project corridor. A request for comments and copies of the archaeological survey report will be sent by the FHWA to the Peoria tribe since they are known to have historical ties to this area of Illinois.

No archaeological sites that merit preservation in place will be impacted by the preferred alignment. The results of subsurface investigations of archaeological sites, and any others found subsequently, will be evaluated for a determination of eligibility (DOE) for the National Register of Historic Places. A formal DOE will be submitted to the Illinois SHPO for concurrence. Should any of these properties be determined eligible, the Advisory Council on Historic Preservation (ACHP) will be notified of the pending adverse effect. If the ACHP chooses to participate in project coordination, a three-party MOA, incorporating a data recovery plan, will be developed among the FHWA, the Illinois SHPO, and the ACHP. Should the ACHP decline participation, ratification of the MOA will be limited to the two other parties.

#### **4.4.1 Archaeological/Subsurface Historical Sites**

The historic and archaeological resource review has been coordinated with the Illinois Historic Preservation Agency (IHPA) (see Appendix B) in accordance with the requirements of 36 CFR 800.4, Identification of Historic Properties. None of the sites identified in the extant records or in the field investigations had been listed on the NRHP. IHPA concurred in September 1998 that 43 archaeological and historic sites identified in the literature and field research will require subsurface evaluation should they be impacted by the preferred alternative and 37 sites were not eligible for the National Register and no further work was required for these sites. Of the 43 sites recommended for subsurface evaluations, three sites are potentially affected by the preferred alternative.



#### 4.4.2 Historic Architectural Structures

An evaluation by IDOT indicated 34 structures (6a, 7b, 8a, 19a, 27b, 35b, 35c, 35d, 42a, 42f, 51c, 51f, 54, 61a, 61e, 92a, 106, 202d, 202g, 202h, 202i, 218d, 220f, 220h, 255j, 257, 267, 343, 360a, 360b, 367, 368, 384, and 67-119), including agricultural structures, were potentially eligible for the NRHP. Efforts were made during the planning process to avoid these structures. None of these structures will be displaced by the preferred alternative. However, right-of-way will be required from the property of #6a, right-of-way and a temporary construction easement will be required from the property of structure 27b, and right-of-way will be required from the property of structure #42a.

Structure #6a (Figure 4-2) is a two and one-half story, wood-frame house with stucco exterior located at 56 U.S. Route 34, Kirkwood, Illinois (see Appendix C, Exhibit 1, Sheet 35). The structure is located on a 32.4 ha (80 ac) parcel at the northwest corner of existing Route 34 and TR62. Structure #6a is 10.2 m (33.5 ft) north of the existing north right-of-way line of U.S. Route 34. The distance from the existing edge of pavement to the house is 23.6 m (77.4 ft).

Early in the study alternate development phase, efforts were made to avoid and minimize impacts to residences and farmsteads, including Structure #6a. The section of the preferred alternative west of TR62 will shift south of the existing alignment. The proposed centerline in front of Structure #6a will be located 20.6 m (67.6 ft) south of the existing centerline. Shifting the alignment to the south allows the proposed improvements to fit within the existing north right-of-way limits, which subsequently eliminated the need for new right-of-way acquisition directly in front of Structure #6a.

The proposed improvement will require 1,377 m<sup>2</sup> (0.34 ac) at the southeast corner of the parcel for right-of-way which is 0.4 percent of the total parcel property. The remaining parcel would be 32.2 ha (79.7 ac) in size. The west limit of the acquisition is 108.9 m (357.3 ft) east of Structure #6a. The proposed edge of pavement to Structure #6a would be 34.6 m (113.5 ft) or approximately 11 m (36.1 ft) further to the south than the current condition. Structure #6a would be 6.9 m (22.6 ft) from the proposed right-of-way which is 0.57 m (1.87 ft) closer than the current condition. No landscaping features (trees, shrubs, etc.) will be affected by the preferred alternative.

The proposed alignment of U.S. Route 34 has been adjusted to minimize the impacts to the property and to nearby residences. A shift in the alignment further south or movement of the horizontal curve further east would displace a farmstead located at the southeast corner of U.S. Route 34 and TR62.

The proposed action will have no effect on the characteristics which make this structure potentially eligible for the NRHP.

Structure #27b is a one and one-half story, three-bay barn that is located on a 9.54 ha (23.6 ac) parcel on the south side of existing U.S. Route 34 near the intersection of CH1 and U.S. Route 34 (see Appendix C, Exhibit 1, Sheet 22). The barn is 65.7 m (215.6 ft) south of the existing south right-of-way line of U.S. Route 34. The distance from the existing edge of pavement to the barn is 77.9 m (255.6 ft). Access to the property is from U.S. Route 34 and is 39.3 m (128.9 ft) east of the U.S. Route 34/CH1 intersection.

Recently, the adjacent parcel to the east was acquired by the owner of the 27b property. The Year 2000 Henderson County Plat Book now shows the two parcels as one combined parcel with an area of 35.54 ha (87.8 ac). The combined property extends east to TR210 (2000E). The proposed improvement to U.S. Route 34 and the U.S. Route 34/TR210 intersection will require 1,966 m<sup>2</sup> (0.49 ac) for right-of-way or 0.50 percent of the total combined parcel and temporary easements.

The section of the preferred alternative near the property involves shifting the alignment to the north. At Structure #27b, the proposed centerline would be located 24.9 m (81.7 ft) north of the existing centerline. This allows the majority of the proposed improvements to fit within the existing south right-of-way limits. Right-of-way would have to be acquired along the north side of existing U.S. Route 34. The distance from the proposed edge of pavement to Structure #27b would be 92.6 m (303.8 ft), or an increase of 14.7 m (48.2 ft) relative to the existing condition. Structure 27b would be 65.7 m (215.6 ft) from the proposed right-of-way which is no closer than the current condition. No landscaping features will be affected by the preferred alternative.

Because of the close proximity to the intersection, the existing access location will have to be removed. A proposed service drive will be located directly across from CH1 at the intersection with U.S. Route 34 and connect east to the existing driveway. Approximately 368 m<sup>2</sup> (0.09 acres) will be required to align the service road with CH1. The distance from the proposed service road to 27b will be 51m (167.3 feet). The service road would be constructed within a 17 m (55.8 ft) wide temporary easement. The temporary easement area would be 895 m<sup>2</sup> (0.22 ac).

The proposed improvement to the U.S. Route 34 and the U.S. Route 34/TR210 intersection will impact the northeast corner of the combined parcel. The amount of right-of-way that would have to be acquired from the northeast corner of the combined parcel is 1598 m<sup>2</sup> (0.4 ac). The west limit of the acquisition is 762 m (2,500 ft) east of Structure #27b. Improvements to U.S. Route 34 and the U.S. Route 34/TR210 intersection would be constructed within a variable width temporary easement from 2.5 m (16.4 ft) to 20.7 m (67.9 ft). The temporary easement area would be 0.6 ha (1.6 ac).

Structure #42a is a two-story, rubble stone, Italianate style house which is located on an approximately 4.7 ha (11.8 ac) parcel at the southwest corner of existing U.S. Route 34 and TR150 in Biggsville (see Appendix C, Exhibit 1, Sheet 18). TR150 (1700E) is located south of existing U.S. Route 34, is oriented north-south, and carries a low volume of traffic. Existing U.S. Route 34 runs east-west along the north side of the #42a property.

Structure #42a is 51 m (approximately 167 ft) from the existing west right-of-way line of TR150 and 53.5 m (approximately 176 ft) from the existing edge of pavement (left of centerline, Station 5+930 to 6+030). The existing right-of-way width of TR150 is 12.19 m (approximately 40 ft).

A component of the preferred alternative involves rerouting Illinois Route 94 through the existing U.S. Route 34/TR150 intersection to the south along existing TR150 to intersect with the proposed U.S. Route 34. Illinois Route 94 will then run concurrent with proposed U.S. Route 34 to the west to the Illinois Route 116 junction south of Union School and follow Illinois Route 94 south.

This new routing of Illinois Route 94 requires an upgrade of existing TR150 to state standards. Illinois Route 94 north of Biggsville is classified as a Rural Collector. Similarly, the rerouted section of Illinois Route 94 would be classified as a Rural Collector. The design criteria for a Rural Two-Lane Collector requires that the roadway be two 3.6-m (12-ft) lanes with 1.2 m (4 ft) shoulders paved on both sides.

The proposed U.S. Route 34 mainline improvement does not directly impact the property. However, the proposed improvements to TR150 will require right-of-way acquisition. Several options were considered to minimize proposed right-of-way in the vicinity of the potentially historic Stone House property west of TR150. Roadway re-alignment to the east would result in an undesirable

intersection offset with Illinois Route 94 north of U.S. Route 34. Other issues on the east side of TR150 include impacts to the Township Maintenance Building and drainage detention basin.

Minimizing ditch depth in conjunction with ditch backslope grading options were determined to be viable options to reduce right-of-way. The proposed right-of-way distance was determined to be 44.2 m (145 ft) to the Stone House which is 6.8 m (22 ft) closer than the current condition. No trees will be taken in front of the house, which faces north. Approximately five trees will be taken along the east property line where right-of-way is required. These trees are approximately 44.2 m (145 ft) from the building and do not contribute to the settling of the house. Approximately 0.1 ha (0.26 ac) of right-of-way would be acquired which is 2.2 percent of the total parcel. The remaining parcel would be 4.62 ha (11.42 ac). The proposed action will have no effect on the characteristics which make structure #42a potentially eligible for the NRHP.

## 4.5 Air Quality

No portion of this project is within a designated nonattainment area for any of the air pollutants for which the USEPA has established standards. Accordingly, a conformity determination under 40 CFR Part 93 (“Criteria and Procedures for Determining Conformity to State of Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 USC or the Federal Transit Act”) is not required.

In accordance with the provisions of “Agreement on Microscale Air Quality Assessments for IDOT Sponsored Transportation Projects; IDOT and IEPA,” this project is exempted from a project-level carbon monoxide air quality analysis because it is a low-volume roadway with a forecasted ADT of 16,000 or less vehicles at the end of the first year of project operation.

## 4.6 Noise

### 4.6.1 Noise Characteristics

Sound is caused by the vibration of air molecules and is measured on a logarithmic scale with units of decibels (dB). Sound is composed of a wide range of frequencies. However, the ear is not sensitive to all frequencies. Therefore, the “A” weighted scale was devised to correspond with the ear’s sensitivity. The resulting unit of measurement is the dBA.

Studies show that a change of 3 dBA is a barely perceptible change in noise. An increase of 10 dBA will be perceived as being twice as loud, as shown on Table 4-9.

Table 4-9. Perceptive Noise Level Changes

Sound Level Change	Relative Loudness
±3 dBA	Barely perceptible change
±5 dBA	Readily perceptible change
±10 dBA	Twice as loud/half as loud

The predominant sources of highway noise include automobiles and trucks. Noise from cars is associated with the tire interaction of captured air in the tire treads at the pavement. While automobile noise is reasonably concentrated at one location on the vehicle, heavy truck noise is made up of three major, separate sources: (1) engine noise, (2) engine exhaust noise, and (3) tire noise. The height of the noise source also contributes to the noise level. For example the average height of a truck is approximately 3.0 m (10 ft) and the truck exhaust stack can range from 2.4 to 3.7 m (8 to 12 ft) high. Therefore, the relative height of the truck noise source requires higher noise barriers for effective mitigation, especially when trucks comprise a significant source of the noise. Within the project corridor, noise is generated by automobile and truck traffic on U.S. Route 34 and ancillary roadways.

Traffic noise assessments use noise prediction models to determine noise levels generated by moving vehicles. Land use areas along the project right-of-way, which includes residences, schools, churches, libraries, hospitals and parks, are considered sensitive noise receptors. Noise levels are predicted for existing, No Action, and design year scenarios using peak hourly traffic volumes. The predicted levels are compared to the federal and state noise regulations.

#### 4.6.2 Noise Standards and Criteria

Highway noise procedural guidelines are promulgated in the 23 CFR Part 772. Five separate noise abatement criteria (NAC) based upon land use were developed to assess potential traffic noise impacts. A traffic noise impact occurs when the noise levels approach, meet or exceed the FHWA NAC listed in Table 4-10. Additionally, traffic noise levels that substantially exceed the existing noise levels also constitute traffic noise impacts. The noise parameter used for evaluating noise is the  $L_{eq}(h)$ , which is the hourly equivalent steady-state sound level that contains the same acoustic energy as the time-varying sound level during the same hour.

Table 4-10. Noise Abatement Criteria

Activity Category	Leq(h), dBA	Descriptions of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

The FHWA regulations specify that after the determination of traffic noise impacts, abatement measures for reducing noise impacts should be examined and evaluated for Type 1 projects, such as new alignment and added lanes. When abatement measures are considered, substantial noise reductions should be obtained. However, some noise abatement measures may not be reasonable and feasible because the abatement measures do not outweigh overall adverse social, economic and environmental effects or the costs of abatement.

In Illinois, traffic noise impacts are interpreted to occur in the following situations:

- Design-year traffic noise levels approach, meet, or exceed the NAC, with approach defined as 66 dBA for Active Category B (NAC of 67 dBA) and 71 dBA for Activity Category C (NAC of 72 dBA).
- Design-year traffic noise levels are a substantial increase over existing traffic-generated noise levels, defined as an increase greater than 14 dBA.

The areas where either of these two criteria have been exceeded are evaluated for the application of noise abatement, which primarily consists of noise barriers.

#### 4.6.2.1 Noise

Noise levels were analyzed for the existing condition and the No Action and preferred alternatives. Thirteen receptors representative of residential areas (Activity Category B) were selected to determine potential noise impacts for the U.S. Route 34 project. Individual residences as well as clusters of homes are distributed along U.S. Route 34 in the project area. Seven receptors were selected west of Monmouth and six were located in the Monmouth area. The alignment of U.S. Route 34 through the area of Monmouth will not be changed with the exception of improvements to some of the intersections. The location of the noise sensitive receptors along U.S. Route 34 are identified on Figure 4-3.

##### Existing Noise Levels

Existing noise levels were estimated for the noise sensitive areas using the FHWA Highway Traffic Noise Prediction Model, the STAMINA version noise model and existing roadway conditions. Table 4-11 summarizes the existing noise levels for the 13 representative receptors located along U.S. Route 34. Noise levels of homes adjacent to U.S. Route 34 vary from 46 dBA to 71 dBA. Receptors 3N and 4N are near the preferred alternative but at a distance from the existing U.S. Route 34 and are associated with noise levels of 46 dBA and 57 dBA, respectively.

Table 4-11. Noise Sensitive Area (NSA) Impact Summary, U.S. Route 34

NSA #	Receptor Description	Number of Units per Receptor	Existing Noise Level, dBA	No Action Level, dBA	Build (2025) Noise Level, dBA	Impact*
1N	Residence at Route 34 and TR50	5	71	73	54	No
2N	Residence at Bogus Hollow Road	3	71	73	71	Yes
3N	Residence on TR122 south of Route 34	1	46	48	68	Yes
4N	Residence on TR150 south of Route 34	1	57	58	65	No
5N	Residence on Route 34 between TR190 and TR198	4	68	69	66	Yes
6N	Residence at Route 34 and TR62	3	67	68	69	Yes
7N	Residence on 60th, south of Route 34	1	37	39	39†	No

Table 4-11. Noise Sensitive Area (NSA) Impact Summary, U.S. Route 34

NSA #	Receptor Description	Number of Units per Receptor	Existing Noise Level, dBA	No Action Noise Level, (2025) Level, dBA	Build (2025) Noise Level, dBA	Impact*
8N	Citizens Lake Park	1 (Campground)	68	69	69**	Yes
9N	East side of Sunny Lane, SE corner of Sunny and 2nd	Approx. 10	56	58	58**	No
10N	East side of Sunny Lane, south of Harlem	Approx. 35	54	56	56**	No
11N	SE corner of Route 34 and Main Street	4 2 houses/2 motels	66	68	68**	Yes
12N	South side of Lawnway Drive, east side of 11th Street	6	68	69	69**	Yes
13N	North of Old Route 34, east of 11th Street	5	48	49	49**	No

\* Impact is defined as approaching, meeting or exceeding the FHWA NAC or causing a substantial increase in noise levels. The noise level which approaches the FHWA NAC is 66 dBA and “a substantial increase” is defined as 14 dBA over existing noise levels.

† Receptor located on alternative alignment eliminated during screening process.

\*\* The improvements to U.S. Route 34 in the Monmouth area are limited to intersection changes. No alignment changes have been proposed. The No Action and Build scenarios are, therefore, the same for receptors in Monmouth (8N to 13N).

Receptor 7N was predicted to have an existing noise level of 37 dBA and is not located on either the existing alignment or the preferred alternative. Receptor 7N was selected for purposes of modeling an alternative alignment, which is no longer being considered.

Existing noise levels for the receptors within the Monmouth area (8N through 13N) range from 48 to 68 dBA. This includes receptor 13N, which is located on the east side of Monmouth approximately 650 m (2,100 ft) south of the U.S. Route 34. The STAMINA noise model accuracy may be reduced beyond 500 feet from the roadway due to meteorological effects not accounted for in the model. Table 4-11 also summarizes the noise levels predicted for the Monmouth area receptors.

### **Future Traffic Noise Levels**

Future traffic noise levels were estimated for the design year of 2025 for both the No Action and preferred alternatives for receptors 1N through 13N. The No Action alternative uses the same alignment and factors as existing conditions with the 2025 traffic volumes. The No Action noise levels for these receptors increased by 1 to 2dBA over the existing levels and range from 39 to 73 dBA (see Table 4-11). The higher noise levels are associated with increased future traffic volumes.

The Build scenario uses the preferred alternative with future (2025) traffic. The Build noise levels at Receptor 1N decreased to 54 dBA from an existing level of 71 dBA due to the shift in the alignment of U.S. Route 34 away from this residential area. The Build noise level at Receptor 2N is 71 dBA, the same as the existing noise level due to a smaller shift in the alignment away from this receptor (see Appendix C, Exhibit 1, Sheet 12).

Receptor 3N is located away from the existing alignment but will be in close proximity to the preferred alternative (see Appendix C, Exhibit 1, Sheet 16). The Build noise level therefore increases 22 dBA over the existing noise levels. Receptor 4N is not directly adjacent to either the existing U.S. Route 34 or the preferred alternative; however, there is an 8-dBA increase in noise levels associated with the preferred alternative.

The Build noise level at Receptor 5N decreases from an existing noise level of 68 to 66 dBA due to the alignment shift away from the receptor (see Appendix C, Exhibit 1, Sheet 21). Receptor 6N increases from 67 dBA to 69 dBA due to the shift in the preferred alignment toward the receptor (see Appendix C, Exhibit 1, Sheet 35).

Noise levels were predicted for the receptors in the area of Monmouth for existing conditions (1999) and future conditions (2025). The same alignments were used for each as the U.S. Route 34 alignment will not be changed. Similar to the No Action alternative for the receptors west of Monmouth, the noise levels increase by 1 to 2 dBA over existing levels due to the increase in traffic between the 1999 and 2025 projections.

#### **4.6.2.2 Traffic Noise Impacts**

The FHWA utilizes NAC to identify traffic noise impacted areas. Using these criteria, 6 of the 11 residential receptors and the campground area were identified as noise impacted receptors. Receptors 2N, 3N, 5N, 6N, 8N, 11N, and 12N are predicted to have Build noise levels that meet or exceed the 66 dBA noise level.

Receptor 2N represents three residences along Bogus Hollow Road. The alignment is being shifted to the north in this area, which reduces the Build noise level from the No Action noise level; however, the Build noise level of 71 dBA still exceeds the NAC.

Receptor 3N is located off the existing alignment but is adjacent to the preferred alternative. The Build noise level of 68 dBA is above the NAC and is an increase of more than 14 dBA over the existing noise level. This receptor is the only residence in this area.

The preferred alternative shifts away from Receptor 5N, lowering the noise level 2 dBA below the existing noise level and 3 dBA below the 2025 No Action level; however the Build noise level of 66 dBA still approaches the NAC. This is a single residence but represents four other residences with similar characteristics located over a distance of approximately 3 km on the south side of U.S. Route 34.

Receptor 6N is located on the north side of U.S. Route 34 at TR62. There are two other residences located over a distance of approximately 1.2 km west of Receptor 6N with similar characteristics. The preferred alternative for U.S. Route 34 begins to turn north (toward Receptor 6N) in this area. The Build noise level is 69 dBA, an increase of 2 dBA from the existing noise levels and exceeds the NAC.

Receptor 8N represents the Citizens Lake Park located on the west side of both U.S. Route 34 and Monmouth. Receptor 8N represents a park and is considered Activity Category B. The park area includes several locations for recreational vehicle or trailer parking for camping purposes. However, it is assumed that 8N represents only one receptor. The existing noise level for this area is 68 dBA, which increases to 69 dBA based on 2025 traffic volumes. Both scenarios exceed the NAC. Receptor 11N represents two residences and two motels, each of which is categorized as Activity Category B with an NAC of 67 dBA. The future traffic noise level at receptor 11N is 68 dBA, an increase of 2 dBA over the existing traffic noise level and above the NAC.

Receptor 12N is a residential receptor that represents six homes adjacent to U.S. Route 34 on the north side and east of 11th Street. The future traffic noise level is predicted to be 69 dBA, an increase of 1 dBA over the existing noise levels and above the NAC.

#### **4.6.2.3 Abatement**

Traffic noise abatement measures must be considered for the areas determined to be impacted by traffic noise along U.S. Route 34. Noise abatement must be designed to reasonably and feasibly achieve a substantial noise reduction. There are three ways to abate traffic noise at existing receptors: change the source, change the receptor, or change the noise path between the source and the receptor. Noise abatement measures normally available for consideration and evaluation are:

- traffic management measures;
- alteration of horizontal and vertical alignments;
- acquisition of property rights for construction of noise barriers;
- construction of noise barriers whether within or outside the highway right-of-way; and
- acquisition of real property or interests therein to serve as buffer zones.

Traffic noise management measures most effective in reducing noise levels include prohibition of heavy trucks and use of lower speed limits, both of which would not be practical along this route due to economic impacts and reduced level of service these options would cause. Alteration of receptor locations or alignments, and acquisition of property rights or real property are not economically reasonable or practical options.

The remaining options address the noise path, essentially the line of sight, between the source and the receptor. Constructing a noise barrier between the source and the receiver would alter the noise path. The most feasible solution to abating traffic noise would be to construct noise walls. Noise berms along U.S. Route 34 would not be feasible given the limited amount of right-of-way available to implement this barrier option. Therefore, only noise walls are considered in the analysis.

The feasibility of implementing abatement measures, such as walls or berms, is affected by site constraints, the achievable reduction in noise levels, and reasonable economic factors. Noise abatement measures were evaluated for the noise-impacted areas considering both the achievable noise reduction and economic reasonableness. OPTIMA, the abatement module of STAMINA, was used to determine the noise wall height needed to obtain a substantial traffic noise reduction.

Receptor 2N is located on the south side of U.S. Route 34 and represents three residences. A noise wall could be constructed near Receptor 2N on the south side of U.S. Route 34 for the two eastern residences. The driveway of the third residence is accessed from U.S. Route 34, requiring a break in the noise wall. A noise wall is not proposed in front of the third residence since the break in the noise wall would greatly reduce the effectiveness. A 4.5-m (15-ft) high wall with a length of approximately 360 m (1,180 ft) would reduce the U.S. Route 34 traffic noise levels by 9 dBA at the two eastern residences. Based on a cost of \$270 per square meter (\$25 per square foot), this wall would cost approximately \$437,000 for the two eastern residences, or \$218,500 per residence, making the wall not economically reasonable.

Receptor 3N is located on the south side of the preferred alternative at the intersection with TR122 and is the only residence in this area. A noise wall could be constructed along the south side of U.S. Route 34 since TR122 is proposed to be terminated at U.S. Route 34 on the north and south sides (it will not intersect U.S. Route 34). A 4.9-m (16-ft) high noise wall with a length of approximately 260 m (850 ft) would reduce the noise levels by 7 dBA. Based on a cost of \$270 per square meter



(\$25 per square foot), this noise wall would cost approximately \$344,000, making the wall not economically reasonable for abatement of this one residence.

Receptor 5N is located on the south side of U.S. Route 34 and represents four residences. Existing driveway access to these four residences is acquired directly from U.S. Route 34. The existing driveway configuration would require breaks in the noise walls to maintain driveway access, which would greatly reduce the effectiveness of the noise wall. The driveways for all four residences will be relocated in the proposed scenario. The driveways for two of the residences will still require a break in the noise wall in front of the residence, making a noise wall ineffective for these two residences. The driveways for the other two of the residences will be relocated to the nearest roadway intersecting U.S. Route 34, thereby removing the access point to U.S. Route 34. A noise wall was therefore evaluated for these two residences.

Receptor 5N and the second residence it represents where a noise wall could be feasible are located approximately 2 km (1.2 mi) apart with two intersecting streets between them. A separate noise wall would therefore be needed for each residence. A 6-m (20-ft) high noise wall with a length of approximately 240 m (790 ft) would reduce the noise levels by 8 dBA. Based on a cost of \$270 per square meter (\$25 per square foot), this noise wall would cost approximately \$389,000, making the wall not economically reasonable for abatement of this one residence. The same wall would be needed for the second residence, for a total cost of \$778,000.

Receptor 6N is located at the northwest corner of TR62 and U.S. Route 34. It represents two other receptors that have driveway access directly to U.S. Route 34. Breaks in the noise wall would be required at these two receptors to maintain the driveway access, which would greatly reduce the effectiveness of a potential noise wall. A noise wall was evaluated for receptor 6N as the driveway access at this location is to TR62. A 4.5-m (15-ft) high noise wall located at along the U.S. Route 34 right-of-way and curved around to the right-of-way of TR 62 would reduce noise levels 9 dBA. The length of the noise wall is approximately 136 m (450 ft). Based on a cost of \$270 per square meter (\$25 per square foot), this noise wall would cost approximately \$165,000, making the wall not economically reasonable for abatement of this one residence.

The proposed improvements to U.S. Route 34 in the Monmouth area are limited to intersection improvements. Abatement analysis was completed even though the proposed improvements in this area do not constitute Type I improvements. A noise wall was analyzed for Citizens Lake Park (8N). A 4.5-m (15-ft) high noise wall with a length of approximately 380 m (1,250 ft) would reduce the traffic noise level by 9 dBA. Based on a cost of \$270 per square meter (\$25 per square foot), this wall would cost approximately \$462,000. Due to the cost, a wall is therefore not economically reasonable at this location.

Receptor 11N is located on the south side of U.S. Route 34 on the east side of Main Street. Two motels are located on the east and west side of the two residential receptors. Due to the commercial nature of the motels, a wall would reduce the commercial exposure currently received by the two establishments. A noise wall was therefore developed specifically for noise abatement at the two residential receptors. A 5-m (16-ft) high wall with a length of approximately 300 m (990 ft) would provide a traffic noise reduction of 8 dBA. The wall was limited on the west end due to the proximity of Main Street to the receptors. Based on a unit cost of \$270 per square meter (\$25 per square foot), the cost of this wall would be \$405,000 or a cost of \$203,000 per residence (or \$101,000 per receptor if the motels were included). A noise wall in this location is therefore not economically reasonable in this location.

Receptor 12N is located on the north side of U.S. Route 34 on the northeast side of Monmouth. The six residences in this location represented by receptor 12N are approximately 3 meters higher than U.S. Route 34 in this area. A 5.8-m (19-ft) high noise wall approximately 430 m (1,420 ft) long would reduce the noise levels by 8 dBA. The noise wall was located along U.S. Route 34 right-of-way. Based on a unit cost of \$270 per square meter (\$25 per square foot), a wall this size will cost approximately \$673,000 or a cost per residence of \$112,000. A wall in this location is therefore not economically reasonable.

The abatement analyses for the noise impacted receptors associated with the preferred alternative are summarized in Table 4-12. The number of homes benefitting from construction of a noise wall is based on residences that experience at least a 5-dBA reduction in noise. Only first row homes were used in this analysis since second row homes were typically farther than 61 m (200 ft) from the proposed noise wall. The effectiveness of noise walls decreases as the distance between the receptor and the noise wall increases.

Table 4-12. Noise Abatement Analysis, U.S. Route 34

	No. of Units	Wall	Wall Length,	Approx.	Reduction	Likely to be	If No,
NSA #	per Receptor	Height, m (ft.)	m (ft.)	Cost, \$	Potential, dBA	Implemented	Reasons Why
2N	3	4.5 (15)	360 (1,180)	\$437,000	9	No	1
3N	1	4.9 (16)	260 (850)	\$344,000	7	No	1
5N	4	6.0 (20)	240 (790)	\$389,000	8	No	1
6N	3	4.5 (15)	136 (450)	\$165,000	9	No	1
8N	1	4.5 (15)	380 (1,250)	\$462,000	9	No	1
11N	4	5.0 (16)	300 (990)	\$405,000	8	No	1
12N	6	5.8 (19)	430 (1,420)	\$673,000	8	No	1

Notes: 1 – Not economically reasonable or feasible based on cost compared to benefit. Benefit analysis is based on IDOT policy value of \$24,000 per benefitted receptor.

#### 4.6.2.4 Construction Noise

Construction noise will be controlled in accordance with Article 107.32 of the IDOT Standard Specifications for Road and Bridge Construction.

## 4.7 Energy

Increases in traffic are expected due to growth in the area and neighboring communities, and planned improvements to U.S. Route 67 from Monmouth to south of Macomb. The existing traffic facility would provide a LOS D for most portions of the route in the design year, 2025. The No Action alternative will result in lowered energy efficiency due to reduced system efficiency and increased congestion. In the long term, post-construction operational energy requirements should offset construction and maintenance energy requirements and result in a net savings in energy. Construction of the preferred alternative will require energy for construction of the route and maintenance activities. Energy consumption by motor vehicles has the potential to increase during the construction period due to traffic delays and rerouting of the traffic. Construction of the preferred alternative will improve overall transportation system efficiency for local and through traffic and thereby reduce energy consumption by motor vehicles.

## **4.8 Natural Resources**

### **4.8.1 Geological Setting**

The No Action alternative would not result in any impacts to the project corridor geological or mineral resources. No active quarries or sand and gravel operations are affected by the preferred alternative. Therefore, the acquisition of new right-of-way and construction of the facility will not affect any commercial mining operations. With the exception of adjustments to local grades due to cut and fill requirements during the construction of the preferred alternative, no significant impacts to surface geology or topography are expected. Consequently, those adjustments are not expected to cause significant changes in groundwater or surface water quality, quantity, and flow. The adjustments will affect the flora and fauna of the area and that discussion follows.

The formations which are exposed in the transition zone between the uplands and the Mississippi River Valley, near the intersection of U.S. Route 34 and Illinois Route 164, are known to have formed from mass movement of the parent material, either through creep, slump, or by landslide. When these formations (the Peyton and Lacon formations) are encountered, sound engineering practices should be employed to stabilize the material.

### **4.8.2 Terrestrial Ecology - Vegetation and Wildlife Habitat**

The No Action alternative will have no effect on the existing vegetation and habitat. The development of the study alternatives was based, in part, on the avoidance and minimization of direct impacts on ecological resources. The discussion below addresses the potential impacts of the preferred alternative to the ecological resources that have been identified in the project corridor.

#### **Habitat Loss**

One effect of the preferred alternative will be a loss of habitat within the proposed right-of-way. Table 4-13 provides the amount of potential habitat loss from each cover type as a result of roadway construction associated with the preferred alternative. The vast majority of habitat loss will occur in the cropland cover type.

Table 4-13. Cover Types Potentially Affected by New Right-of-Way for the Preferred Alternative

Cover Types	Total Project Area		Preferred Alternative		No Action
	Ha	Ac	Ha	Ac	
Cropland	11,090.3	7,403.7	239.8	592.3	0
Woodland	718.8	1,776.1	8.3	20.4	0
Old Field	553.2	1,366.9	10.7	26.5	0
Farmstead/Residential	406.5	1,004.5	8.8	21.7	0
Pasture/Hayland	298.6	737.8	5.1	12.6	0
Existing Road	223.0	551.0	3.7	9.1	0
Public	100.3	247.8	0.3	0.7	0
Wetland	66.0	163.0	0.2	0.4	0
Industrial	61.9	152.9	0.1	0.3	0
Open Water	35.0	86.5	0.4	1.0	0
Orchard	16.8	41.6	<0.1	<0.1	0
Prairie	4.1	10.1	0.7	1.6	0

Botanical Site #3 (Figure 4-4) (Appendix C, Exhibit 1, Sheet 10) is the only noteworthy plant community, as described by Handel (1998), that falls within the right-of-way of the preferred alternative. This small sand hill prairie has been identified as having a diverse mixture of prairie grasses and forbs but has been disturbed with recent grazing. Handel, 1998, states that the best quality occurs just north of U.S. Route 34 and the quality degrades northward. Approximately 0.65 ha (1.61 ac) out of a total 1.56 ha (3.85 ac) or nearly 42 percent of Botanical Site #3 will be directly impacted by the limits of construction for the preferred alternative in this high quality area just north of the existing roadway.

In an attempt to minimize the impact to this area, the top 6 inches of topsoil could be removed from this cut area and stockpiled until the desired grade is achieved. This topsoil with its preserved native seed bank could then be replaced prior to seeding with an annual cover crop and similar native prairie grass seed mixture.

Associated with habitat loss will be a reduction in floral and faunal species diversity and a general reduction in annual plant productivity. These impacts are not anticipated to be significant for the majority of the project corridor consisting of cropland or in areas where improvements will be located along the existing roadway. Impacts to Botanical Site #3 can be minimized as previously described.

### **Barrier to Movement**

A four-lane highway, such as would result from the preferred alternative, can be a significant barrier to the movement of terrestrial animals. During spring, breeding populations of reptiles and amphibians are frequently migrating along established corridors such as drainage channels. These drainage channels, as well as impacted wetlands and streams, will be bridged or culverted thus preserving the existing corridors for aquatic and amphibious biota. Therefore, the preferred alternative should result in little impact on these species.

### **Construction and Operational Mortality**

During construction of the preferred alternative, wildlife displacement and mortality may result from excavation, vibration, and soil compaction associated with the operation of heavy equipment. These impacts, however, will be of a limited duration and are thus not anticipated to be significant.

Operational mortality may increase with the preferred alternative based on a potential increase in vehicle-animal collisions. All terrestrial and avian species are subject to vehicle-induced mortality. Birds may become victims of highway traffic as they search for food and grit or as they cross the highway. Slower moving reptiles and amphibians may also become victims of the fast moving traffic on this expanded highway. As stated above, however, the aquatic corridors often used by these species will be preserved with bridges and culverts. Mammals represent the largest number of vehicle-animal collisions with raccoons, opossum, and rabbits being the most common. Vehicle collisions with the white-tailed deer are also common and can cause substantial damage to the vehicle and may injure the vehicle occupants. While vehicle-animal collisions resulting from the preferred alternative may affect individual animals, it is not expected to affect any animal species as a whole.

#### **4.8.3 Threatened and Endangered Species**

The No Action alternative will not impact threatened or endangered species. The proposed project will not impact federal or state listed species. The IDNR closed endangered and threatened species consultation on October 9, 2001 (Appendix B, Agency Action Report).

##### **4.8.3.1 Federally Listed Species**

Correspondence with USFWS in July 1996 and April 1999 (see Appendix B) resulted in the identification of several listed species that have the potential to occur within the U.S. Route 34 project corridor. Though surveys were conducted, no federal listed species were identified in the project corridor. Due to the lack of suitable nesting habitat for bald eagles; lack of suitable habitat for maternity Indiana bat colonies; and lack of suitable habitat for Mead's milkweed, eastern prairie orchid and Higgins' eye pearly mussel, the proposed project is not anticipated to affect federal listed species.

##### **4.8.3.2 State Listed Species**

Coordination with INHS in January 1999 resulted in the identification of several threatened or endangered species within the project corridor. The discussion below addresses the potential impacts of the preferred alternative to these species.

##### **Brown Creeper**

INHS consulted the Illinois Natural Heritage Database, the Illinois Fish and Wildlife Information Service, and the Illinois Breeding Atlas to determine which state threatened and endangered species occur, or have the potential to occur, within the U.S. Route 34 project corridor. During surveys conducted by INHS, the brown creeper (state threatened) was observed at several different woodland sites within the project corridor; however these sites are located between ½ to 1 mile from the preferred alternative's construction limits. INHS did not observe any breeding habitats within the preferred alternative's construction limits (Amundsen and Enstrom, 1998). Given the avoidance of wetland habitats, the bridging of perennial streams, and the avoidance of those locations where the brown creeper was observed, it is anticipated that there will be no adverse impacts to this species.

##### **Western Hognose Snake**

The western hognose snake (*Heterodon nasicus*) is state listed threatened, and generally inhabits dry, sandy prairies. Although there are documented occurrences at Gladstone Lake, there are no direct observations within the preferred alternative area. Suitable habitat has been identified by INHS near the intersection of the existing U.S. Route 34 and Illinois Route 164. Through the alternative develop-

ment and evaluation process, effort has been expended to avoid and minimize the impacts to this habitat (see Section 3.0). Efforts to align the preferred alternative with the existing U.S. Route 34 at this point have minimized the effects to the snake and its habitat. Although the potential exists for a small portion of the area to be impacted, no adverse impacts to the western hognose snake are anticipated.

#### **Illinois Mud Turtle**

The state endangered Illinois mud turtle (*Kinosternon flavescens*) is known to inhabit temporary to permanent ponds and is generally found in habitats associated with sand prairies. The turtle is believed to be extirpated from the project corridor, but may inhabit Gladstone Lake. Surveys yielded no sightings of the mud turtle in the area (Amundsen and Enstrom, 1998). Potential mud turtle habitat will not be impacted by the preferred alternative.

#### **River Otter**

The river otter (*Lontra canadensis*) is listed as state endangered and has the potential to occur within the preferred alternative which will be bridged. However, INHS personnel found no evidence for the presence of river otters along the creek. Implementation of the preferred alternative is not expected to adversely impact this species. Potential river otter habitat will not be impacted by the preferred alternative.

## **4.9 Water Quality/Resources**

### **4.9.1 Surface Water Resources**

The No Action alternative will not impact surface water resources and aquatic ecology in the project corridor. These aquatic resources, however, could be potentially impacted by implementation of the preferred alternative. Potential impacts may be short-term or long-term in nature. Short-term impacts are primarily related to construction activities, whereas long-term impacts may be associated with either construction or operation and maintenance activities.

#### **Construction Impacts**

Typically, the most common and readily observed water quality impact during construction activities results from the erosion of disturbed soil and sedimentation into nearby watercourses. During precipitation events disturbed soil is transported by surface runoff to local bodies of water which leads to the sedimentation of existing substrates and increases in turbidity by filling the water column with suspended solids. The frequency and severity of storms during the construction phase may further exacerbate potential sedimentation problems.

An increase in sedimentation and turbidity can have adverse effects on aquatic primary production, feeding, reproductive success, upstream migration, and spawning in some fish species. In some cases, adults may be able to survive while unhatched eggs and fry may not be able to endure the lack of a clean substrate. Many of the less mobile benthic macroinvertebrates could be buried under the load of sediment. Construction impacts will be minimized with the installation of appropriate erosion control in accordance with IDOT's "Joint Design/Construction Procedure Memorandum on Erosion and Sediment Control" prior to the commencement of activities that disturb and expose existing soil.

Turbidity and sedimentation associated with the construction phase of the preferred alternative are expected to return to baseline levels soon after construction ceases. Research has indicated that highway construction impacts can be detrimental to neighboring surface water resources but that the

impact in many cases has been temporary (Chishom and Downs, 1978; Barton, 1977; Reed, 1977). These studies have indicated that fish and benthic macroinvertebrate communities may recover quickly after construction activities have ceased and that implementing appropriate erosion control methods are effective in reducing adverse impacts.

Direct habitat alterations through culvert and bridge construction can also adversely impact surface water resources. Bridge crossings generally entail less habitat alteration than culvert crossings. By the very nature of installing culverts and pipes, stream channel substrates are modified. Long-term impacts could result by reducing quality habitat to a lesser or undesirable habitat. The loss of habitat could lead to a decline in sensitive fish, macroinvertebrates, or mussel fauna, and an increase in more tolerant species. Walters (1995) noted that a substrate change from gravel riffles to sand and silt deposits caused a species shift from large macroinvertebrates to populations of small burrowing species less available to foraging fish. Streams within the proposed right-of-way, however, are primarily silt-laden with little or no gravel substrates. Long-term impacts in the form of stream channel substrate alteration, therefore, are expected to be minimal.

The preferred alternative will cross 5 different perennial streams 7 times and 6 different intermittent streams 6 times for a total of 13 surface water crossings (Table 4-14, Figure 4-5). Perennial streams include the Carthage Lake drainage ditch at three locations, P.D. Creek, an unnamed tributary to the Mississippi River (locally known as Lone Tree Creek), South Henderson Creek, and Markham Creek. Crossing by bridging is the method identified as having the lowest potential impact to surface water resources, as it reduces the degree of ground disturbance, does not constrict the stream channel, and maintains the natural substrates of the streambed. All but one perennial stream crossings will be bridged. Consequently, crossings at these locations are not expected to result in significant long-term effects on hydrology or biota. Two perennial stream crossings that will not be bridged include the unnamed tributary to the Mississippi River (locally known as Lone Tree) and Markham Creek. This unnamed tributary (Lone Tree) is located in the western portion of the project corridor and is currently culverted. Markham Creek, is located at the eastern end of the existing U.S. Route 34 and is already culverted. Improvements at Markham Creek will not require the existing structure to be altered.

Table 4-14. Proposed Surface Water Crossings Associated with the Preferred Alternative for U.S. Route 34

Map Label	Description	Stream Type Designation*	Crossing Type†	Approximate Drainage Area Above Impact	
				km <sup>2</sup>	mi <sup>2</sup>
ST-1a	Carthage Lake drainage ditch (relocation of TR137)	P	B	55.8	21.5
ST-1b	Carthage Lake drainage ditch (widen existing bridge)	P	B	55.8	21.5
ST-1c	Carthage Lake drainage ditch (eastbound ramp for Carman Road interchange)	P	B	55.8	21.5
ST-2	Unnamed intermittent stream	I	C	3.2	1.3
ST-3	P.D. Creek	P	B	13.8	5.3
ST-4	Unnamed Tributary to the Mississippi River (Locally Known as Lone Tree Creek)	P	B	7.9	3.1
ST-5	Tributary of South Henderson Creek	I	C	0.9	0.4

Table 4-14. Proposed Surface Water Crossings Associated with the Preferred Alternative for U.S. Route 34

Map Label	Description	Stream Type Designation*	Crossing Type†	Approximate Drainage Area Above Impact	
				km <sup>2</sup>	mi <sup>2</sup>
ST-6	South Henderson Creek	P	B	164.1	63.4
ST-7	Tributary of South Henderson Creek	I	C	2.9	1.1
ST-8	Tributary of South Henderson Creek	I	C/R	3.8	1.5
ST-9	Tributary of South Henderson Creek	I	R	0.5	0.2
ST-10	Drainage to Citizens Lake	I	X	0.3	0.1
ST-11	Markham Creek	P	X	24.2	9.3

\* P = permanent flow; I = intermittent flow

† B = bridge; C = culvert; R = relocation; X = existing crossing will be utilized.

Source: Harding ESE, 2001.

The remaining intermittent stream crossings will be culverted, or galvanized pipes will be installed at the smaller, sporadically flowing drainage crossings. For those waterways not crossed, the proximity to construction activities along with the predominant direction of drainage patterns will determine the potential for impact. Existing U.S. Route 34 crosses most of the streams proposed for crossing by the preferred alternative so alterations of community composition are not anticipated. Section 4.14.2 provides information on those water resource areas that will require special consideration for erosion and sediment control during construction.

Two intermittent streams (Appendix E, Figure E-1) will be relocated as a result of construction of the preferred alternative. As a result of being culverted, ST-8 will be relocated 113 m (371 ft). ST-9 will be relocated for 110 m (361 ft) as a result of the need to place fill material to establish the roadbed.

### **Operation and Maintenance Impacts**

Pollutant loading, resulting from highway operation and maintenance activities, has the potential to impact the surface water resources throughout the life of the highway. It has long-term impact potential that can adversely affect the aquatic biota of receiving waters. Some anticipated pollutants associated with motor vehicle operations and highway maintenance are heavy metals, asbestos, ethylene glycol, petroleum products, rubber, deicing salts, and herbicides. These pollutants can move through the environment via runoff, splash, and spray, affecting both the water quality and the biotic integrity of receiving waters.

Highway runoff on receiving streams can be minimized through design, construction, and operational features such as the use of vegetated drainage ditches, preservation of riparian areas, detention basins, erosion control features, and deicing control management. Studies have indicated, however, that rural highways have lower pollutant levels in runoff than urban highways and as a result have a smaller potential for receiving water problems (FHWA-RD-88-0089, 1990).

### **Permits**

The construction of the preferred alternative will affect five wetlands comprising 0.17 ha (0.42 ac) and disturb land potentially contributing sedimentation to nearby streams and wetlands. As a result, the following permits will be required pursuant to the CWA prior to the initiation of construction



activities: a Section 404 permit, a Section 401 Water Quality Certification permit, and a National Pollutant Discharge Elimination System (NPDES) permit. Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Two types of 404 Permits can be issued under the permit review process: an Individual Permit and a Nationwide Permit 14. An Individual Permit is usually required for potentially significant impacts. For minimal adverse effects, the USACE often grants an up-front Nationwide Permit 14. Wetland impacts for the preferred alternative (see Section 4.11, Wetlands) are minimal and will likely be granted a Nationwide Permit 14. All stream crossings that would require a Section 404 permit are identified in Table 4-14. Effects to streams are anticipated to be minimal and a Nationwide Permit 14 is anticipated for these stream crossings. All Section 404 permits will require a Section 401 Water Quality Certification Permit from the IEPA, to ensure the state's water quality will not be adversely affected.

A NPDES permit is required because it is anticipated that this project will result in the disturbances of 2 or more hectares (5 or more acres) of total land area. Accordingly, it is subject to the requirement for a NPDES permit for storm water discharges from the construction sites. Permit coverage for the project will be obtained either under the IEPA General Permit for Stormwater Discharges from Construction Site Activities (NPDES Permit No. ILR10) or under an individual NPDES permit. Requirements applicable to such a permit will be followed, including the preparation of a Stormwater Pollution Prevention Plan. Such a plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site and shall describe and ensure the implementation of practices which will be used to reduce the pollutants in discharges associated with construction site activity and to assure compliance with the terms of the permit.

#### **4.9.2 Groundwater Resources**

The No Action alternative will have no impact on groundwater resources. The construction of the U.S. Route 34 preferred alternative is not expected to have a significant effect on the total groundwater supply or the groundwater quality anywhere along the preferred alternative even though a slight reduction in the recharge area will occur due to the increase in paved area.

Based on water well records obtained from the ISGS, 11 private water supply wells are located within 60 m (183 ft) of the preferred alternative and 4 private supply wells are located within the preferred alternative right-of-way. No municipal water supply wells are located within 60 m (183 ft) of the preferred alternative or existing U.S. Route 34. During the acquisition and construction phases of this project, those wells which are within the right-of-way will be abandoned in accordance with Illinois Department of Public Health regulations. There are no proposed highway support facilities within the setback zone for any water supply well.

#### **4.10 Floodplains**

Executive Order 11988, Floodplain Management, mandates the evaluation of potential floodplain impacts by major federal actions. FEMA FIRMs for Henderson and Wayne Counties, dated 1986 and 1999, were used to identify Zone A (100-year floodplains) and Zone B (areas protected by levees from the base flood ) associated with the proposed project (see Section 2.8, Floodplains). There are no FEMA floodways within the project corridor.

The No Action alternative will result in no additional impacts to floodplains. Approximately 23.7 ha (58.6 ac) of the existing right-of-way for U.S. Route 34 are built within the 100-year floodplain (Zone A). The length which the existing facility crosses the 100-year floodplain is 0.9 km (0.56 mi). In the flood of 1993, sections of Carman Road were closed due to standing water on the roadway (personal communication Russell, 1998). This section of Carman Road may continue to flood and become impassable during future flooding events.

The limits of construction for new right-of-way required by the preferred alternative will potentially impact a total of 6.8 ha (16.8 ac) of designated 100-year floodplain (Zone A) with a length of 1.2 km (0.7 mi) (Figure 4-6). All appropriate portions of the preferred alternative will be elevated above the 50-year floodplain. The preferred alternative will not:

- interrupt or terminate emergency services or evacuation routes; or
- adversely impact natural and beneficial floodplain values.

There is a slight potential that the preferred alternative may promote incompatible floodplain development. The potential, however minor, exists that some developers could view the area surrounding a newly elevated roadway that is less likely to flood as potential for development.

Other alternates were considered in the alternative process that encroached less floodplain area and length than the preferred alternative. These alternates were eliminated due to potential impacts to Native American burial grounds, farm residential displacements, wetlands, woodlands, and a sand hill prairie (botanical site #3) (see Sections 3.5 and 3.6).

### **Mississippi River Floodplain**

The Mississippi River floodplain within the Henderson County portion of the project corridor is protected by a levee that FEMA has accepted as adequate to protect against overtopping for a 100-year flood or smaller. The FIRM map indicates a dual floodplain condition (Zones A and B) exist within the Mississippi River floodplain for Henderson County. Zone A consists of interior areas (protected by the levee) but are subject to flooding by local storm events. Drainage from the interior area of Districts 1 and 2 is southerly to a single pump station at Crystal Lake south of U.S. Route 34. Zone A includes areas at elevations 158.5 m (520.0 ft) and lower. This flood condition is referred to below as interior floodplain. Zone B includes areas protected from a 100-year river flooding source by a levee and not subject to interior flooding. Zone B floodplain is referred to below as Mississippi River floodplain.

The western portion of the preferred alternative is located within the natural Mississippi River floodplain where approximately 4.2 ha (10.4 ac) of the Mississippi River floodplain will be transversely impacted for a length of 0.7 km (0.4 mi). For a 100-year flood or less, the preferred alternative will have no effect on surface water elevation, flood storage, or conveyance as the levee will protect the floodplain in this area. Results of the hydraulic study indicate impacts on the Mississippi River floodplain during floods larger than a base flood event (100-year frequency flood) would include an insignificant increase in water surface elevation, and minor decrease in flood storage capacity, and a potential for loss of conveyance (obstruction).

The road embankment in the segment of roadway transverse to the Mississippi River floodplain flow direction is at elevation 160.6 m (526.9 ft) approximately, or elevated above surrounding ground elevations by approximately 0.9 m (3 ft) or less. Assuming the floodplain is flooded only in event of levee failure by overtopping, the area is flooded only for river floods with frequency of greater than 100 years. The 100-year flood elevation for the Mississippi River near the area, River Mile 407, is

approximately 163.3 m (535.6 ft) (FEMA). This means that the area near the road would be under approximately 3.0-3.4 m (10-11 ft) of floodwater and the roadway would be submerged by approximately 2.1-2.4 m (7-8 ft) of water. The roadway embankment can be assumed, under those conditions, to create only an insignificant impact on the water elevations upstream (north) of the roadway. The actual impact is problematic due to the uncertainties associated with flow rate through the floodplain area which would depend on levee failure location, size of failure, and other variables.

The Mississippi River drainage area of this location is approximately 308,290 square km (119,000 square mi) and the peak discharge of record at the Keokuk gaging station was 446,000 cubic feet per second (cfs), or 12,640 cubic meters per second, on July 10, 1999 (USGS). Assuming the fill volume placed in the floodplain below the 100-year flood elevation is 120,000 cubic m (156,833 cubic yards), the flood storage volume lost would be 97 acre-ft, which is equivalent to 49 cfs-days or 0.01 percent of the total peak river flow volume over a 24-hour period. Stated another way, the river at the peak flow rate would fill the 120,000 cubic m volume lost in less than 10 seconds. Because the area is behind levees, this loss of storage impacts river flood conditions only for events that cause the levee to overtop or otherwise fails.

The preferred alternative could potentially impact river flood flow conveyance where the alignment traverses the floodplain. As stated above, the road would be under 2.1 to 2.4 m (7 to 8 ft) of water and the impact to river flood flow conveyance would therefore be minimal. Additionally, the Chicago Burlington and Quincy railroad embankment that is located north, or upstream, of the proposed roadway embankment also traverses the floodplain in a similar orientation as the proposed roadway. The railroad embankment has top of embankment elevations of approximately 162.5 to 162.8 m (533 to 534 ft) according to the USGS 7.5-minute quadrangle map and would, therefore, create a much greater obstruction to floodplain flow than would the proposed roadway.

For the interior flood condition, similar flood water storage and conveyance considerations exist. Based on a 100-year interior flood condition (Zone A), the flood elevation is 158.5 m (520.0 ft). Approximately 4.9 ha (12 ac) of the interior area below elevation 158.5 m (520.0 ft) would be fill by roadway embankment. A flood runoff hydrograph and routing model (HEC-1) was developed for the interior drainage area. The loss of 4.9 ha (12 acres) of storage area would result in an increase in 100-year and more frequent interior flood event water levels of approximately 0.01 m (0.04 ft) or less in the area south of the railroad embankment and vicinity of U.S. Route 34.

A southerly flow direction is generated by the pumping station and potentially the limited natural land slope in the District 1 and 2 area. The preferred alternative will minimize impacts on conveyance by providing bridges over the Crystal Lake Drainage Ditch that create backwater to less than allowable by Illinois law for new bridges and culverts. State regulation [17 IAC 3700.70(a)(3)] requires that new bridges in rural areas not cause a flood elevation increase of more than 0.3 m (1.0 ft) immediately upstream of the bridge nor result in a flood elevation at a point 304.8 m (1,000 ft) upstream of the bridge that is more than 0.2 m (0.5 ft) greater than the difference between the flood elevation immediately upstream of the bridge and the natural condition flood level at 304.8 m (1,000 ft) upstream. The runoff model predicted conservatively large flows in Crystal Lake Drainage Ditch of approximately 1,700 cfs for the 100-year flood.

**South Henderson Creek Floodplain**

The preferred alternative will result in transverse floodplain encroachment to South Henderson Creek impacting approximately 2.6 ha (6.4 ac) of these floodplains for a length of 0.5 km (0.3 mi). Potential impacts to South Henderson Creek floodplains include obstruction or loss of conveyance and minor reductions of storage capacity.

To minimize impacts to South Henderson Creek, a bridge designed for a 100-year flood frequency will be utilized. To reduce impacts, the bridge opening and any structural components will be designed and oriented with the Henderson Creek flood flows to reduce impacts to an acceptable condition. Once construction activities are completed at these locations and structures are in place, no significant obstruction of stream conveyance or adverse impacts to natural and beneficial floodplains values are anticipated. The proposed bridge increases the 100-year flood elevation immediately upstream of the bridge by approximately 0.15 m (0.48 ft). The project condition 100-year flood elevation immediately upstream of the bridge is also approximately 0.09 m (0.31 ft) above the natural condition flood elevation at a point 304.8 m (1000 ft) upstream of the bridge. These two criteria satisfy the requirements of 17 IAC 3700.70(a)(3). The actual increase in 100-year flood elevation is estimated to be approximately 0.3 m (1.09 ft) at a point approximately 304.8 m (1000 ft) upstream of the bridge.

Other flood related issues are believed to be relatively insignificant provided that culverts and bridges are designed and constructed according to current good hydraulic design practices and regulatory standards.

**Summary**

With regards to the Mississippi River floodplain, the modifications to drainage structures will result in an insignificant change in their capacity to carry flood water. This change will cause a minimal increase in flood heights and flood limits. These minimal increases will not result in any significant adverse impacts on the natural and beneficial floodplain values; there will be no significant change in flood risks; and there will be no significant increase in potential for interruption or termination of emergency service or emergency evacuation routes; therefore, it has been determined that this encroachment is not significant.

The impact on South Henderson Creek floodplain is measurable and, while the backwater (i.e., the increase in flood elevation upstream of the crossing) is less than State of Illinois maximum allowable for a new bridge, the backwater impact may extend upstream for a considerable distance and will incrementally increase the flood risks on those lands adjacent to the existing floodplain for a distance of at least 304.8 m (1,000 ft). For a 100-year flood, the preferred alternative could affect cropland and woodland immediately upstream of South Henderson Creek.

**4.11 Wetlands****4.11.1 Impact Assessment**

As presented in Section 3.0, avoidance of wetland resources was a critical consideration in the development and selection of the preliminary and final study alternates. Over the course of the location study planning process, the project corridor was evaluated by the INHS and the project team for the presence of jurisdictional wetlands (see Section 2.9). In order for a wetland to be determined

jurisdictional, an area must possess wetland hydrology, hydric soils, and a prevalence of hydrophytic vegetation as described in the 1987 USACE Wetland Delineation Manual.

The assessment of potential impacts to wetlands was based upon direct wetland losses relating to the in-wetland construction activities as well as potential indirect impacts. Direct impacts to wetlands due to the construction of the preferred alternative include vegetation removal, the placement of fill material, and potential changes to hydrologic regimes and patterns. Potential wetland crossings are depicted in Figure 4-5, and the estimated area of wetlands displaced is summarized in Table 4-15.

Table 4-15. Summary of Potential Impacts to Wetlands

INHS #	NWI Classification	NRCS Classification	Crossing Type	Area Impacted Ha (Ac)	Total Wetland Area Ha (Ac)	FQI
40	PEMC	Wetland	Fill	0.04 (0.10)	0.8 (0.2)	9.20
41	PEMCh	Wetland	Culvert/Fill	0.03 (0.07)	0.06 (0.2)	2.30
54	PUBGh	Artificial Wetland	Culvert/Fill	0.02 (0.05)	0.37 (0.9)	8.50
105	not mapped	Wetland	Culvert/Fill	0.04 (0.10)	0.21 (0.5)	14.10
137	not mapped	not mapped	Culvert/Fill	0.04 (0.10)	0.06 (0.1)	12.25

Out of 35 wetlands identified within 457 m (1,500 ft) of existing U.S. Route 34, the preferred alternative will potentially affect five wetlands comprising a total wetland impact of 0.17 ha (0.42 ac) (see Table 4-15 and Appendix E). During field determination efforts, FQI was utilized as a vegetative community tool to reflect the overall habitat quality of each wetland community. The FQI is a measure of the quality of a vegetative community and indicates the level of disturbance of a site. An index value of 20 or greater suggests a high quality community with a high proportion of native species. The FQI of those wetlands to be impacted ranged from 2.30 to 14.10, indicating that those sites that will be affected by the project are of low to moderate quality. A summary description of each of the impacted wetlands is presented in Table 2-17. Compensatory mitigation is required for unavoidable wetland impacts, per the “no net loss” policy.

While the potential for indirect impacts to wetlands is recognized, those wetlands that will be impacted are currently located adjacent to, or downgradient of, the existing facility. Similar to existing conditions, residual gas and oil pollutants, as well as salt, may run off from the preferred alternative to the adjacent wetlands resulting in decreased water quality. Increased turbidity, sedimentation, and accumulation of chemical pollutants may result in compositional shifts to plant communities, alteration of local faunal assemblages, changes in productivity and biomass, and mortality to aquatic species. Measures to minimize harm to wetland systems will be incorporated during construction by following “The State of Illinois Department of Transportation’s Special Provisions for Project Erosion Control Systems.”

Reducing the areas of Wetlands #54 and #105 may indirectly impact the recharge zones to these wetlands. Size reduction may result in a change in hydrologic patterns that can either increase or decrease the frequency of saturation or flooding of a given wetland. In addition, drainage characteristics of the roadway and associated ditch system may result in increased conveyance rates and alteration of surface and subsurface flow patterns. This impact will be minimized through proper design, and maintenance of existing drainage dynamics.

#### **4.11.2 Wetland Mitigation: Impact Avoidance and Minimization**

In compliance with the goals stipulates in IDOT's Wetland Action Plan, the Interagency Wetland Policy, Section 404(b) of the CWA, and Executive Order 11990, extensive efforts were made to avoid and minimize impacts to wetlands to the extent practicable over the course of the alternative development and evaluation process. Coordination with appropriate agencies, including the USACE and IDNR, included two NEPA/404 merger meetings. On September 29, 1997, a consensus was reached on the Purpose and Need, facility type, and DEIS documentation for the proposed project. The second merger meeting occurred on September 25, 1998. Upon review of the environmental constraints and alternate evaluation process, consensus was reached on which alternates were to be carried forward as final alternates. A third merger meeting would normally be held to gain concurrence on the preferred alternative. However, avoidance measures have reduced the amount of wetland impacts and it is anticipated that the preferred alternative will meet the conditions of a Nationwide Section 404 permit and will not require an Individual Section 404 permit (see Appendix B, B-38). Therefore a third concurrence meeting will not be required for the proposed action.

The four avenues of mitigation that can compensate for highway related impacts to wetlands include: (1) impact avoidance, (2) impact minimization, (3) impact rectification, and (4) impact compensation.

Impact avoidance is not always possible due to the absence of other feasible alternatives. Wetland impact avoidance and minimization were an integral consideration throughout the alternative development and evaluation processes. Impact avoidance was, therefore, of principal concern during the development of the final study alternates and in the selection of the preferred alternative. Wetland locations obtained through the review of the existing data (i.e., NWI, NRCS mapping and aerial photography) were mapped prior to the establishment of the preliminary alternates. All the alternates developed were designed to avoid wetlands to the greatest extent possible. The field reconnaissance conducted on the final study alternates was also performed to identify other constraints (i.e., topography, residences, historic structures, etc.) within the proximity of each individual wetland. If this information indicated that a shift in the proposed alignment would avoid a wetland impact without creating additional residential displacements or impacts to other natural resources, the wetland was avoided. The wetland crossings along the preferred alternative are as perpendicular as possible, thus demonstrating the greatest avoidance possible while also attempting to minimize impacts to agricultural land, infrastructure, and displacements in residential and commercial areas. Impact avoidance and minimization were also conducted as evidenced in the selection of the preferred alternative which impacts the least number of wetlands and the least acreages of wetland habitat.

A second potential avenue of mitigation is impact minimization, which is equally applicable to all wetland crossings. Reducing impact magnitude can be accomplished by strict adherence to the IDOT's Temporary Erosion and Sedimentation Control Program. Proper scheduling of construction can reduce erosion, sedimentation, and their associated impacts on aquatic resources. Additionally, wetland crossings can be designed to be the least disruptive to aquatic and wetland communities (e.g., perpendicular crossings, culvert design).

Specifically, impact avoidance and minimization efforts were conducted in the vicinities of Wetlands #137, #105, #54, #41, and #40 (see Appendix E).

**Wetlands #105 and 137**

An overview of the constraints issues in the vicinity of wetlands #105 (Figure 4-5 and Appendix E, Figure E-5) and #137 (Figure 4-5 and Appendix E, Figure E-6) includes:

- South of Existing Route 34--Steep topography, woodlands, a creek, an INHS mapped botanical site, observed brown creeper habitat, Bogus Hollow Road, Wetland #105, and four residences; and
- North of Existing Route 34--Moderately steep topography, agricultural land, Wetland #137, a pond, a cell tower located between TR111 and TR94, and the Biggsville community and potential historic structures to the east. The bypass of the Biggsville community begins in the proximity of TR111.

Locational build alternatives were examined through the Bogus Hollow area which involved holding the north and south rights-of-way and evaluating the efficiency and safety of reduced cross sections through the area. Due to the relatively steep topography in the Bogus Hollow areas, the initial alignment of the preferred alternative required the placement of large quantities of fill material south of existing U.S. Route 34. This condition would have resulted in the closing of Bogus Hollow Road as a through road by bisecting the road and creating two dead end streets. Efforts to realign existing Bogus Hollow Road were considered not feasible and impractical due to local topographic and drainage issues, and the likely requirement of multiple creek crossings. In addition, local residents strongly opposed the closing of Bogus Hollow Road as a through road.

A shift in the alignment resulted in impacting a pond (nonjurisdictional wetland site #136) and Wetland #137. Examination of an alignment north of existing U.S. Route 34 indicated that it was not geometrically feasible to maintain the necessary radius of curve through the area as the alignment becomes oriented in an east-southeast direction to initiate the bypass of Biggsville. In this scenario, the pond would still be impacted and the road would be located adjacent and upstream of Wetland #137. The northern alignment also increased impacts to agricultural land by bisecting parcels with the probability of creating additional diagonal severances. This alignment orientation would have also led to four residential displacements, additional impacts to woodlands, and require relatively large quantities of fill.

The current alignment of the preferred alternative through this area avoids the pond, does not result in any residential displacements, is geometrically feasible, avoids the cell tower, results in a partial impact to Wetland #105, and minimizes impact to woodlands. In the direct vicinity of Wetland #105, impacts have also been minimized by utilizing a minimum vertical profile, which has reduced the width of right-of-way required through the area.

**Wetland #54**

Constraints issues in the vicinity of Wetland #54, between TR190 and TR210 (Figure 4-5 and Appendix E, Figure E-4), include agricultural land to the north and south of existing Route 34, residences/farmsteads on the south, South Henderson Creek to the north, and a potentially historic structure (27b) and adjacent hog farm south of CH1 (see Figure 4-5 and Appendix C, Exhibit I, Sheets 21 and 22). The alignment through this area must maintain the proper geometrics as the bypass of Biggsville area meets the existing route due east of TR190. Complete avoidance of Wetland #54 was considered impractical due to the resulting impacts to residences, farmsteads, agricultural land, and the potentially historic structure by shifting the alignment of the preferred alternative to the south of existing U.S. Route 34.

Examination of potential alignment alternatives to the north of Wetland #54 indicated relatively high impacts to South Henderson Creek that would arise from multiple stream crossings and impacts to riparian zones.

Impact minimization has been demonstrated by aligning the preferred alternative in such a way to impact the southern limit [0.02 ha (0.05 ac)] of the 0.37 ha (0.9 ac) wetland. Additional impact minimization has also resulted by avoiding impacts to residences and reducing impacts to agricultural land.

#### **Wetland #41**

Beyond the bypass of Biggsville, the preferred alternative connects with the existing alignment of U.S. Route 34 in the vicinity of TR190, and continues eastward holding the existing south right-of-way (Figure 4-5 and Appendix E, Figure E-3). During the development of study alternates, a primary objective was to maximize, to the extent practicable, the existing right-of-way of U.S. Route 34. This objective was identified as a means by which to avoid and minimize impacts to the environment. Wetland #41 is located south of U.S. Route 34 and west of TR18. To the west of this area the preferred alternative maintains the south right-of-way line to reduce impacts to agricultural land and farming operations, to reduce the number of residential displacements, to avoid impacts to potentially historic structure 27b (see Section 4.4.2), and to avoid displacing a hog farm operation.

A portion of Wetland #41 is being impacted as the alignment begins to move off the south right-of-way due west of TR26 (between TR4 and TR18) to the south to avoid residential displacements. Additionally, shifting the alignment to the north or the south would impact agricultural land and displace additional residences and farmsteads. Minimization of impact is being practiced through this area as the alignment will impact approximately one-half of the wetland, and the crossing will be designed as perpendicular as possible while still maintaining the required geometrics.

#### **Wetland #40**

As described in Section 4.11.1, Wetland #40 is actually a cluster of seven separate wetlands occurring within and near to a drainageway (Figure 4-5 and Appendix E, Figure E-2). Approximately 0.04 ha (0.10 ac) of the 0.80 ha (2.0 ac) wetland will be impacted by the preferred alternative. Previous alignments of the preferred alternative did not impact this wetland. However, during the public meeting process, local farmers voiced opposition to the impacts to agricultural land occurring to the west and east of the existing facility. The previous alignment caused considerably greater direct conversions of agricultural land, and created diagonal severances. Ultimately, the public requested that the preferred alternative stay as close to the existing facility as possible.

Complete avoidance has been determined to be not practicable from both design criteria and impact perspectives. This stretch of road occurs approximately mid-way within a large S-curve. The alignment of the preferred alternative has been located to allow for the required curve radii both to the south and west (from CH11/FAS413) and to the north and east (east of 165 Avenue). Movement to either the east or west in the vicinity of Wetland #40 would cause a “ripple effect” in the location of the alignment of the preferred alternative to the east and to west. The resulting impacts would be relatively high, with increased impacts to agricultural land (including ground used for seed production), create diagonal severances, cross an increased number of parcels, impact access to Kirkwood, and create the potential for drainageway relocation. Previous study alternates through this area had been eliminated for these reasons.



### **4.11.3 Wetland Mitigation**

Pollutant loading to wetlands as a result of normal operation and maintenance is not expected to be significant, and these potential impacts may be minimized. Such minimization measures may include the design of curbs, gutters, and inlets to enhance the retention of grit and other particles by diverting roadway runoff through grassed waterways and buffer strips prior to their discharge to nearby wetlands. Additional mitigation measures will be accomplished through adherence to IDOT's Special Provisions for Project Erosion Control Systems.

Compensatory mitigation will be developed for unavoidable impacts to wetlands and other special aquatic sites as required by the USACE. Should compensatory wetland mitigation be required for this project, the IDOT will develop the mitigation in consultation with the USACE and any other appropriate agencies involved in the regulatory process.

Offsite (out-of-basin) wetland mitigation will be utilized for compensatory purposes. LaGrange Wetland Bank is located in Brown County, Illinois, southwest of Beardstown. The LaGrange Wetland Bank is located in the LaMoine River drainage basin and is bounded by the LaMoine River to the north and the Illinois River to the east.

## **4.12 Special Waste**

The sites listed as special waste sites were identified either through the IEPA LUST/UST lists, the IEPA Division of Land Pollution Control Land Inventory, the CERCLIS database, and/or the ISGS PESA. The listed sites which were shown to be within the project corridor were then field verified as to location relative to the preferred alternative. In addition, any potential special waste sites which were within the project corridor but not listed in public records were also assessed in relation to the preferred alternative. The final report on the results of the PESA was completed on September 14, 1999.

### **4.12.1 Hazardous Waste**

No CERCLIS sites will be involved (nor impacted by) the preferred alternative.

### **4.12.2 Non-Hazardous Waste**

The No Action alternative will have no impacts to special wastes. A PESA for special waste was conducted by the ISGS. The assessment concluded that the preferred alternative could involve sites potentially impacted with regulated substances. Further, it has been determined that not all of the sites can be avoided. The sites which cannot be avoided include the Ayerco Convenience Center, Gladstone Grain Company, Thompson Trucking, Wareco #340, Stockland FS Inc., and CMS Tire Service. All of the sites, except for Gladstone Grain Company, involve petroleum contamination from leaking underground storage tanks. Gladstone Grain Company involves types of contamination other than petroleum and was found to contain elevated levels of the herbicides alachlor and atrazine. The nature and extent of the involvement are known and the areas of contamination will be managed and disposed of in accordance with applicable Federal and State laws and regulations and in a manner that will protect human health and the environment.

#### **Ayerco Convenience Center, Site 1040-1**

The Ayerco Convenience Center, located at the northwest corner of Carman Road and U.S. Route 34 (see Figure 2-8, SW-1) (Appendix C, Exhibit 1, Sheet 1a) near the western terminus of the project, was sampled by the ISGS as part of the ISGS PESA. The site reportedly has five USTs (four active and one inactive). Four soil borings were advanced to a depth of either 1.8 m (6 ft) or 2.8 m (9 ft) below the ground surface. The headspace of the soil samples collected from the four borings were analyzed in the field using a photovac gas chromatograph (PGC). All of the four borings installed by the ISGS on August 23, 1999 were found to contain constituents consistent with gasoline impacted soils. The constituents found included benzene, toluene, o-xylene, and ethylbenzene.

Due to past changes in the right-of-way location, the current right-of-way is apparently located between the location of the former pump islands and the current location of the store and related installations (pump islands, tank pit, etc.). In order to realign the existing ditch and complete the proposed access road, the proposed alignment will involve grading and excavating up to 0.9 m (3 ft.) of soil which is within 7.6 m (25 ft) of boring 1040-1a. In addition, up to 0.9 m (3 ft.) of soil will be removed from the former gas station location in order to construct the planned access road. This proposed excavation is within the area where the concrete footing of the former station is located.

### **Gladstone Grain, Site 1040-3**

Gladstone Grain Company, located on the south side of U.S. Route 34 at the intersection of U.S. Route 34 and Illinois Route 164 (see Figure 2-8, SW-6) (Appendix C, Exhibit 1, Sheet 10), is the site of a grain storage facility. During the field investigation for the PESA, the ISGS noted an area of distressed vegetation immediately southeast of the entrance to the facility. The entrance to the facility is immediately south of the intersection of U.S. Route 34 and Illinois Route 164. In addition, a washing area is located approximately 100 m (330 ft) west of the main entrance and approximately 24 m (80 ft) south of the centerline of U.S. Route 34. The ISGS installed and sampled two borings near the distressed vegetation area and two borings near the washing area. The borings installed within the distressed vegetation area were both found to contain the pesticide alachlor above the ingestion level of the IEPA Tier 1 residential Tiered Approach to Cleanup Objectives (TACO) and the boring installed nearest the wash area was also found to contain alachlor above the ingestion level of the IEPA Tier 1 residential TACO. The alachlor levels found were below the Tier 1 soil remediation levels for ingestion for industrial/commercial properties. In addition, these three borings were also found to contain alachlor and atrazine above the migration to Class 1 groundwater values for IEPA Tier 1 residential TACO.

The area immediately surrounding soil borings 1040-3c and 1040-3d will be excavated to a depth ranging from approximately 0.9 m (3 ft.) at boring 1040-3c to 2.1 m (7 ft.) at boring 1040-3d. This excavation is to install a new culvert and will then be backfilled to a depth approximately 0.3 meters (1ft.) below existing grade.

### **Thompson Trucking, Site 1040-5**

Thompson Trucking is a small trucking firm with onsite repair facilities located at the southeast corner of the intersection of 150th Avenue and 20th Street, approximately 1.6 km (1 mi) south of Kirkwood (see Figure 2-8, SW-8) (Appendix C, Exhibit 1, Sheet 28). During the preparation of the PESA, the ISGS installed and sampled three borings on the site. No VOCs above background levels were encountered.

### **Wareco #340, Site 1040A-6**

During the ISGS PESA 1040A, no VOCs significantly above background levels were detected at this facility, located at 1125 North Main (see Figure 2-8, SS-4) (Appendix C, Exhibit 1, Sheet 43). However, boring 1040A-bb, located along the east side of Main Street between the two driveways,

did not stay open for the collection of a soil gas sample from a depth of 2.7 m (9 ft). It is the opinion of IDOT, in consultation with the Chief Counsels Office, that if construction excavation and utility relocation do not exceed 2.7 m (9 ft) within 15 m (50 ft) of this boring, then no additional preliminary testing is required.

#### **Stockland FS, Site 1040A-7**

During the ISGS PESA, borings were installed along the west side of Main Street adjacent to the facility located at 1010 North Main Street (see Figure 2-8, SS-5) (Appendix C, Exhibit 1, Sheet 43). Soil samples from both borings were found to contain petroleum constituents above 30 parts per million (ppm) at a depth of 0.9 m (3 ft). IDOT concludes that if construction excavation and utility relocation do not exceed 0.6 m (2 ft) in depth within 7.6 m (25 ft) of boring 1040A-7A, which is located on the north side of the brick planter adjacent to the dispensers, and if construction excavation and utility relocation do not exceed 0.9 m (3 ft) within 7.6 m (25 ft) of boring 1040A-7B, located on the east side of the USTs, then no additional preliminary testing is required.

At present, the boring locations at the Stockland F.S. facility are located outside the project boundaries. It is not known what actions the utility companies are planning in response to the project.

#### **CMS Tire Service, Site 1040A-8**

The ISGS installed two borings at this facility, located at 1121 West Broadway Avenue (see Figure 2-8, SW-9) (Appendix C, Exhibit 1, Sheet 46). Both borings were found to contain elevated VOCs with retention times similar to gasoline constituents. IDOT has concluded that if no construction excavation or utility relocation occurs at depths greater than 0.9 m (3 ft) on this property, no further preliminary testing is required.

### **4.13 Visual Resources**

The No Action and preferred alternatives were evaluated to determine the impact on the visual environment in the three landscape units identified in the project corridor. The landscape units described in Section 2.11 comprise the Mississippi River floodplain and floodplain terraces, the bluff area, and the upland area.

The proposed improvements are located adjacent to the existing U.S. Route 34 facility except for two locations. The proposed route is east of the existing U.S. Route 34 on upper terraces of the floodplain from CH15 to the area where the existing U.S. Route 34 turns in an east-west orientation. The other area is the Biggsville bypass which swings south of the existing route at TR94 remaining south of the existing high school site and reconnects at TR178.

No changes in visual impacts are anticipated as a consequence of either the preferred alternative or No Action alternative for the following reasons: changes from the existing route are in areas of homogenous topography that provide little visual diversity; the preferred alternative is the same as the existing U.S. Route 34 in the approaches to the bluff area and in the bluff area; and there are no significant visual impacts from large cuts or fills from grading areas of the proposed study alternative.

### **4.14 Mitigation Measures**

The term mitigation is defined by the 1978 CEQ regulations (40 CFR Part 1508.20) as:

- avoiding an impact all together by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree or magnitude of the action and its implementation;

- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact by preservation and maintenance operations during the life of the action; and
- compensation for the impact by replacing or providing substitute resources or environment.

#### 4.14.1 Project Alternative Development and Evaluation

Throughout the alternative development process, exhaustive efforts were made to avoid impacts to the environment including businesses, residents, agriculture, cultural resources, and natural resources. Alternatives that would potentially impact a relatively high number of residents, a burial mound site, a sand hill prairie, habitat suitable for the hognose snake, a large area and number of wetlands, and a large woodland area were eliminated (see Section 3.0, Alternatives). Alternatives were re-evaluated and modified to minimize the magnitude of unavoidable impacts. Potential impacts to farmland, wetlands, floodplains, and cultural resources were minimized by refining the alignments of study alternates in locations where practicable.

#### 4.14.2 Construction

Mitigation measures identified in the IDOT manuals, “Standard Specifications for Road and Bridge Construction” and “Special Provisions for Temporary Project Water Pollution Control” will be utilized to help reduce the effects of roadway construction on surface water resources. The seasonal timing of the construction can also be important for lowering the impacts to the surface water resources. Those areas where erosion and sediment controls will require special consideration are presented in Table 4-16.

Table 4-16. Erosion and Sediment Control Locations Needing Special Consideration

Design Station	Resource	Activity to be Controlled
19+750 to 19+760	Crystal Lake drainage ditch	Construction of bridge approaches
24+840 to 24+860	Unnamed intermittent stretch	Embankment construction and drainage structure
26+220 to 26+250	P.D. Creek	Construction of bridge and vegetation clearing
27+190 to 27+220	Unnamed Creek (lone tree)	Construction of bridge
32+090 to 32+150	Wetland 137	Fill and grading for roadway
32+450 to 32+600	Wetland 105	Fill and grading for roadway
36+920 to 36+940	Tributary of S. Henderson Creek	Embankment construction and drainage structure
39+290 to 39+380	South Henderson Creek	Construction of bridge, clearing of riparian vegetation
40+890 to 40+920	Wetland 54	Fill and grading for roadway
101+580 to 101+600	Wetland 41	Fill and grading for roadway
102+300 to 102+320	Tributary of S. Henderson Creek	Drainage structure
104+250 to 104+450	Wetland 40 and tributaries of S. Henderson Creek	Relocate streams, fill and grade for roadway, drainage structure
8+550 to 8+570	Drainage to Citizens Lake	Drainage structure
14+310 to 14+340	Markham Creek	Existing bridge

#### **4.14.3 Operation and Maintenance**

Roadway operation and maintenance activities may have long-term effects such as increased motor vehicle traffic resulting in higher pollutant levels reaching surface water resources. Some anticipated pollutants associated with motor vehicle operations are toxic heavy metals, asbestos, slowly biodegradable petroleum products, rubber, deicing salt, etc. Studies have indicated that rural highways have much lower pollutant levels in runoff, and as a result, a substantially smaller potential for adverse effects on water quality (FHWA-RD-88-008 1990). Pollutants associated with highway maintenance can be conveyed over and through grassed road banks and grassed roadside ditches and eventually to the project area streams. The grassed ditches will aid in reducing roadway pollution by filtering street flow and runoff. This occurs as the grassed areas increase the opportunity for infiltration of insoluble pollutants, deposition of silts, and adsorption onto plants and soil. FHWA research investigating pollutant loading from highway stormwater runoff has shown that the levels of several pollutants increase significantly when ADTs are above 30,000 (FHWA, 1990). However, because the projected traffic volumes on the relocated route are less than 30,000 ADT, pollutant loading is not expected to be significant.

#### **4.14.4 Potential Wetland Mitigation Areas**

Offsite (out-of-basin) wetland mitigation will be used for compensatory purposes. The mitigation site will be the LaGrange Wetland Bank, located in the northeast corner of Brown County, Illinois, approximately 4.8 km (3 mi) southwest of Beardstown, Illinois. From a hydrologic perspective, the La Grange Wetland Bank is located in the southeastern tip of the LaMoine River drainage basin, and is bounded by the LaMoine River to the north and Illinois River to the east.

Wetland compensation following the guidelines of the Illinois Interagency Wetland Policy Act requires individual wetland impacts measuring less than 1.2 ha (0.5 ac) to be mitigated at an offsite (out-of-basin) ratio of 3.0 to 1.0. Based upon a total wetland impact of 0.17 ha (0.42 ac), the total compensation area measures 0.51 ha (1.26 ac).

#### **4.14.5 Tree Mitigation**

A tree survey was conducted at 41 crossings along the proposed right-of-way for the preferred alternative to determine the number of trees and tree species that may be impacted. Field work was conducted by four Harding ESE biologists/ecologists between March 1 to March 3, and March 9, 2000. Aerial maps with established stations were used as references to identify and locate tree populations.

Agricultural fields dominated the project corridor. Tree populations within the proposed right-of-way were typically established on the slopes of roadside drainage ditches adjacent to existing U.S. Route 34; fencelines of cultivated fields bordering the upper boundary of constructed drainage slopes; and bottomland sideslopes, stream banks, and associated drainages. The boundaries of established tree populations relative to the proposed right-of-way were initially established via aerial mapping and subsequently verified during field reconnaissance. Trees were identified to species, counted, and diameter breast height (DBH) was measured and recorded to ascertain a range of species diameters within populations. Species identification followed Mohlenbrock (1989) and the Missouri Department of Conservation (1998). Trees less than 6 inches DBH were excluded from this survey.

Species composition varied with topographic features. Upland and sideslope species commonly encountered within the existing right-of-way of Route 34 included red pine (*Pinus resinosa*), eastern white pine (*Pinus strobus*), and eastern red cedar (*Juniperus virginiana*). Fencerows were typically planted with Osage orange (*Maclura pomifera*) and honey locust (*Gleditsia triacanthos*). Tree species associated with bottomland areas including sideslopes and stream banks included Osage orange, elms (*Ulmus* spp.), black willow (*Salix nigra*), eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), black walnut (*Juglans nigra*), and hickories (*Carya* spp.). Osage orange, hackberry (*Celtis occidentalis*), maples (*Acer* spp.), and oaks (*Quercus* spp.), were prevalent in all topographic areas. Tree species identified in residential areas generally occurred in small numbers and included Norway maple (*Acer platanoides*), black cherry (*Prunus serotina*), Iowa crab apple (*Malus ioensis*), London planetree (*Platanus hybrida*), Norway spruce (*Picea abies*), and weeping willow (*Salix babylonica*). A small grove of common apple trees (*Malus sylvestris*) was identified on a residential property. One nonnative fir tree (*Abies* spp.) was not identified to species. A total of 36 individual species were identified within the proposed right-of-way.

A number of oaks and elm trees (100) were encountered that could not be identified to species due to identification difficulties in the field. Ninety-six trees were identified to four genera and four trees of the same species were unidentifiable (Table 4-17). Due to the seasonal timing of the tree survey, morphological characteristics such as floral parts and attached leaves were sparse or nonexistent. Identification was performed primarily through bark structure and color, and twig morphology (i.e., color, pubescence, pith, leaf and bundle scars, and bud structure).

Approximately 3,428 trees with a diameter equal to or greater than 6 inches DBH will be removed from the proposed right-of-way to facilitate construction. A list of tree species and the number of individuals impacted is presented in Table 4-17.

A Tree Mitigation Plan will be prepared during final roadway design to provide guidelines for the replacement of trees removed greater than 6 inches in diameter due to construction impacts. A total of 3,428 trees within the proposed right-of-way will be mitigated for compensation purposes. Specifications regarding species selection, planting locations, and planting methodology(ies) will be consistent with IDOT's Tree Mitigation Policy. Species selected for tree mitigation will be based upon the particular species impacted. However, the actual species planted will be dependent largely upon their commercial availability. Tree mitigation areas which occur throughout the project corridor are listed on Table 4-18. Generally, opportunities for tree mitigation may be available at the Henderson County Conservation Area east of Illinois Route 164, the HENCO Hills golf course, and along the project corridor creeks and drainages. The latter would provide riparian zone enhancement opportunities.

## **4.15 Short-Term Impacts Versus Long-Term Productivity**

The construction of the preferred alternative will incur short-term impacts to the environment. These include potential impacts to noise, water quality, and natural resources. Noise levels may increase with the use of construction equipment. Although minimized by implementing erosion control techniques, the removal of ground cover during construction activities could lead to erosion, sedimentation, turbidity, and displacement of aquatic fauna in area streams. Natural resources such as fossil fuels, cement, asphalt, sand, and steel would be required for the actual construction of the roadway. Consumption of fossil fuels by motor vehicles may increase due to traffic delays and rerouting of the traffic during construction.

Table 4-17. Tree Species Impacted Within the Proposed Right-of-Way, Route 34, Illinois

Species Composition	Common Name	DBH Range (inches)	Total Number of Trees
<i>Abies</i> spp.*	Fir	24	1
<i>Acer negundo</i>	Boxelder	9-19	6
<i>Acer platanoides</i>	Norway Maple	8	1
<i>Acer saccharinum</i>	Silver Maple	10-53	35
<i>Carya laciniosa</i>	Shellbark Hickory	28-46	8
<i>Carya ovata</i>	Shagbark Hickory	14-21	14
<i>Celtis occidentalis</i>	Hackberry	6-32	173
<i>Cretageus</i> spp.*	Hawthorn	6.5-11	9
<i>Fraxinus nigra</i>	Black Ash	11-55	33
<i>Fraxinus pennsylvanica</i>	Green Ash	7-24	12
<i>Gleditsia triacanthos</i>	Honey Locust	6-38	122
<i>Juglans nigra</i>	Black Walnut	6-54.5	742
<i>Juniperus virginiana</i>	Eastern Red Cedar	6-29	171
<i>Maclura pomifera</i>	Osage Orange	6-62	459
<i>Malus ioensis</i>	Iowa Crab Apple	8-14	5
<i>Malus sylvestris</i>	Common Apple	6	14
<i>Picea abies</i>	Norway Spruce	8-22	4
<i>Picea pungens</i>	Blue or Colorado Spruce	8-12	36
<i>Pinus resinosa</i>	Red Pine	6-62	582
<i>Pinus strobus</i>	Eastern White Pine	6-17	102
<i>Platanus hybrida</i>	London Planetree	22	1
<i>Platanus occidentalis</i>	American Sycamore	22-48	4
<i>Populus alba</i>	White Poplar	18	1
<i>Populus deltoides</i>	Eastern Cottonwood	6-80	183
<i>Populus tremuloides</i>	Quaking Aspen	6-14	12
<i>Prunus serotina</i>	Black Cherry	12-14	2
<i>Quercus</i> spp.*	Red Oak	8-47	16
<i>Quercus</i> spp.*	White Oak	7-36	34
<i>Quercus alba</i>	White Oak	8-103.5	31
<i>Quercus imbricaria</i>	Shingle Oak	6-12	7
<i>Quercus macrocarpa</i>	Bur Oak	16	1
<i>Quercus palustris</i>	Pin Oak	18-30	3
<i>Quercus rubra</i>	Northern Red Oak	8-95	17
<i>Quercus veletina</i>	Black Oak	6-54	157
<i>Robinia pseudoacacia</i>	Black Locust	9-42	39
<i>Salix babylonica</i>	Weeping Willow	50	1
<i>Salix nigra</i>	Black Willow	6-54	71
<i>Ulmus</i> spp.*	Elm	7-18	36
<i>Ulmus americana</i>	American Elm	6-64	227
<i>Ulmus pumila</i>	Siberian Elm	13-26	2
<i>Ulmus rubra</i>	Slippery Elm	6-65.5	50
Unknown spp.		12-35	4
Total			3428

\* Trees identified to genus.

Source: Harding ESE, 2001.

Table 4-18. Tree Mitigation Areas

Exhibit, Sheet	Description
Exhibit 1, 1a	Excess right-of-way in the SW quadrant of the drainage ditch and U.S. Route 34
Exhibit 1, 1a	Station 20+000, uneconomical remnant S of relocated TR137
Exhibit 1, 1a	Station 20+090, uneconomical remnant at intersection of proposed TR137 and Carman Road
Exhibit 1, 4	Station 23+050 to 23+330, uneconomical remnant and pavement removal area
Exhibit 1, 4	Station 23+340, uneconomical remnant and pavement removal area at NW quadrant of U.S. Route 34 and CH15
Exhibit 1, 4	Station 23+330 to 23+400, uneconomical remnant and pavement removal area at SW quadrant of U.S. Route 34 and CH15
Exhibit 1, 5	Station 24+280 to 24+330, uneconomical remnant SW quadrant
Exhibit 1, 5	Station 24+290 to 24+330, uneconomical remnant SE quadrant
Exhibit 1, 7	Station 25+980 to 26+230, uneconomical remnant
Exhibit 1, 7	Station 25+880 to 26+170, landlocked parcel
Exhibit 1, 8	27+125 to 27+225, uneconomical remnant
Exhibit 1, 8	27+250 to 27+640, uneconomical remnant
Exhibit 1, 8 & 9	Station 27+820 to 27+850, pavement removal area
Exhibit 1, 11	Station 30+300, uneconomical remnant
Exhibit 1, 13	Station 32+800 to 32+910, pavement removal area
Exhibit 1, 13	Station 32+900 to 33+000, uneconomical remnant
Exhibit 1, 13	Station 33+000 to 33+160, uneconomical remnant N of U.S. Route 34
Exhibit 1, 13	Station 33+000 to 33+100, uneconomical remnant S of U.S. Route 34
Exhibit 1, 14 & 15b	Station 33+460, pavement removal area N of U.S. Route 34
Exhibit 1, 14 & 15a	Station 33+460, pavement removal area S of U.S. Route 34
Exhibit 1, 15a & Exhibit 1, 15b	Station 34+860 to 35+310, landlocked
Exhibit 1, 18	Station 37+800 to 38+180, uneconomical remnant
Exhibit 1, 19 & 20	Station 39+570 to 39+820, uneconomical remnant
Exhibit 1, 20	Station 39+880 to 40+160, uneconomical remnant
Exhibit 1, 20	Station 40+100 to 40+150, pavement removal area
Exhibit 1, 28	Station 103+260 to 103+390, uneconomical remnant
Exhibit 1, 28	Station 103+390 to 103+600, uneconomical remnant
Exhibit 1, 30 & 31	Station 105+700 to 106+600, pavement removal area
Exhibit 1, 37a	Station 112+210 to 112+280, uneconomical remnant and pavement removal area SE quadrant
Exhibit 1, 37a	Station 112+280, pavement removal area north of U.S. Route 34
Exhibit 2	Station 29+080, uneconomical remnant
Exhibit 2	Station 29+800, uneconomical remnant
Additional Areas to be Investigated	Gladstone Lake and Citizens Lake

Source: Harding ESE, 2001.



Transportation improvements were based on state planning which considered present and future traffic and land use requirements. The long-term benefits of the preferred alternative would be improved system capacity, system continuity, and travel safety (see Section 1.0, Purpose and Need). The local short-term impacts of the preferred alternative and the use of resources for it are deemed consistent with the maintenance and enhancement of long-term productivity for the communities in the project corridor.

## **4.16 Irreversible and Irretrievable Commitments of Resources**

Irreversible and irretrievable commitments are those impacts due to construction of a build alternate that cannot be mitigated or replaced in the future. Implementation of the preferred alternative will involve a commitment of a range of natural, physical, human, and fiscal resources.

The commitment of approximately 278 ha (687 ac) of land for new right-of-way is required. This land is primarily farmland that will be removed from production. Land use in the construction of the preferred alternative is considered an irreversible commitment during the time period that the land is used for a highway facility.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material will be expended. Additionally, large amounts of labor and natural resources will be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use will not have an adverse effect upon continued availability of these resources. Any construction will also require a substantial one-time expenditure of both state and federal funds which are not retrievable.

The commitment of these resources is based on the concept that residents in the immediate area, state, and region will benefit by the improved quality of the transportation system. These benefits will consist of improved accessibility and safety, savings in time, and greater availability of quality services which are anticipated to outweigh the commitment of resources.

## **4.17 Secondary and Cumulative Impacts**

Additional secondary and cumulative impacts may occur as a result of the construction of the preferred alternative. In this context, secondary impacts are defined as those effects which would be caused by the proposed project later in time or further removed in distance but would still be reasonably foreseeable. Cumulative impacts include those that result from the proposed action as well as other highway projects that are linked in some manner (geographically, functionally, or in timing) to the proposed action, or those that result from development that affects the same environmental setting.

### **4.17.1 Secondary Impacts**

Secondary impacts of the build alternates include those impacts that are attributable to development which may occur near the new route. This potential development may occur as a result of transportation advantages provided by construction of a new highway, coupled with aggressive marketing by the appropriate communities and business organizations, development incentives, provision of services, approval of proper zoning, annexation of property currently outside municipal boundaries, and future changes in the market characteristics of the project corridor.

Topography and lack of adequate services such as sewer and water will limit the intensity of development in the preferred alternative area, particularly for industrial development. Expected increases in traffic volume on the new highway will create market opportunities for traffic dependent businesses such as gas stations or convenience stores, especially at interchanges. These types of businesses would involve the conversion of minimal areas of undeveloped land. All alternates considered provide a similar potential for secondary commercial development along the highway.

Industrial uses are not traffic dependent and, therefore, will not be influenced by an increase in traffic volume along the proposed alternative, although improvements in the road facility itself will provide benefits. The work force in the project corridor is relatively small. The small work force together with a lack of available infrastructure, limits the probability of large industrial uses locating in the corridor.

Secondary impacts are, therefore, likely to be limited, in proportion to the limited development that will be induced by the construction of the proposed project. The potential development of convenience stores or gas stations would result in the conversion of minor acreage of undeveloped land to predominantly parking lot. Potential secondary impacts associated with such development include the conversion of land uses and ecological communities that are associated with the development site (probably agricultural land), as well as undiscovered cultural resources. However, due to the small acreage of these developments, no significant impacts are anticipated. In addition, because the induced development is limited, impacts to community infrastructure (e.g., water treatment facilities) are anticipated to be inconsequential.

#### **4.17.2 Cumulative Impacts**

Cumulative effects are those "...impacts which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions" (40 CFR 1508.7). As such, identifying and assessing the potential for cumulative impacts involve focusing on the nature of the proposed project, the organization and composition (i.e., ecological structure, diversity, and connectivity; land use) of the affected environment, those actions which have already contributed to the existing environment, and those which could in the foreseeable future. In order to provide focus and relevance to the exercise of cumulative impact assessment, it is critical to identify those resources that may be significantly affected over time. The most prominent impacts - relative to direct effects - associated with the proposed improvements to U.S. Route 34 include those to the Mississippi River floodplain and to agricultural land. Section 3.0 (Project Alternatives), summarizes the efforts to avoid and minimize impacts to farmland, farm operations, and floodplains during the study alternate development and project alternative evaluation processes.

As detailed in this document, the predominant economic and social feature within the project corridor and surrounding area (Warren and Henderson Counties) is agriculture; most prominently row crop farming. This condition has long-created a landscape that is rural, intensively managed, and ecologically disturbed relative to pre-settlement conditions. The historic, regional tradition of farming has been affected somewhat over the past 50 years or so. The decline in farming has occurred for a number of reasons, including reduction in the number of family farms, crop price fluctuations, the increase of large corporate farms, development pressures, and other societal changes and generational shifts in career preferences. These factors, among others, have contributed to decreased numbers of farmers and the amount of land dedicated to agriculture. Detailed discussion of the transition of society away from agrarianism is beyond the scope of this document. However, it is relevant to indicate that, similar to national trends, there has been a trend of fewer farms and conversion of farm land in Warren and Henderson counties. The data for the two counties indicate

fewer number of farms and presumably farmers, and a reduction of ground dedicated to agriculture. Data gathered by IDOA between 1990 and 1997 show a decline of land in farm by 4,179 ha (10,327 ac) in Henderson County, and 4,804 ha (11,871 ac) in Warren County (IDOA, 1997). It is likely that a large portion of this land is not being directly converted to other uses. Rather, land may not be planted given current economic conditions (i.e., low crop prices), and therefore may return to farm when the opportunities for profit improve.

The proposed action will lead to the direct conversion of 274 ha (677 ac) of agricultural land to roadway and associated right-of-way. Since agriculture comprises the predominant landscape element it is likely that future development will lead to further conversion of farm land to non-farm uses. Cumulative impacts are likely to occur in the vicinity of existing communities, especially in the Monmouth area as the city expands to the east and north. In recognition of national and regional trends in land use, and in identifying the direct impacts of the preferred alternative, the proposed project will contribute to the incremental loss of farm land. These losses, however, are not considered significant when combined with past and reasonably foreseeable future actions.

Cumulative impacts to floodplains are not considered adverse or significant. All floodplain crossings will be designed and constructed in compliance with applicable floodplain regulations. Areas of roadways within floodplains are anticipated to be elevated above the 50-year floodplain. As indicated in Section 4.10, there may be cumulative issues relative to many unrelated fill placement projects within the Mississippi River floodplain over time. Also, there are design specifications that will be applied to culvert sizing and the potential effects to land upgradient and downgradient from the piping. Identified needs for compensatory flood storage within the floodplain will be addressed during facility design. There do not appear to be any development initiatives or plans within the existing floodplain within the project corridor.

Conversations with local municipalities identified the following projects that are currently planned within, or near, the project corridor.

- IDOT has recently completed improvements to Route 34 from the Carman Road intersection to Gulfport. This portion of Route 34 was originally a two-lane facility and was improved to four-lanes. Approximately 100 acres of agricultural land that was located within the 100-year floodplain was required for this project.
- Biggsville has received a grant to build a new library on 3-4 acres of agricultural land. Construction is scheduled to begin during the summer of 2000, and is anticipated to be completed in 2001. Primary effects of this project are the removal of agricultural land from production.
- Approximately 5 acres of city land north of Citizen Lake is being converted to ball parks for the Pony league from Monmouth. This sports park is anticipated to accommodate state and regional competitions. The park was located in this area, in part, due to the proximity of Route 67 and Route 34. The land is a mowed field and will continue to be maintained by the City of Monmouth. There are no anticipated impacts to agricultural land or floodplains as a result of this project.
- A 20-acre agricultural plot in Monmouth, south of Route 34, is now being converted to a commercial/residential area. A retirement complex adjacent to Monmouth Hospital at #2 Industrial Park Drive in Monmouth, IL is being constructed and scheduled to be completed by June 2000 occupies 5 acres. Protexall and Western IL Home Health are also located on this parcel. Currently, the rest of this plot remains vacant. Although only a portion of this plot is occupied, development is expected to occur on the majority of this land. Consequently, this project required the removal of 20 acres of agricultural land from production.

- Hawthorn Inn and Suites is currently being built at the northeast corner of Route 34 and West Broadway and scheduled to be completed by May 1. This motel occupies 4.5 acres that were previously zoned residential. There are no anticipated impacts to floodplains or agricultural land as a result of this project.
- Americ Inn is investigating constructing a motel adjacent to the golf course on Route 34 in Monmouth. This site is approximately 5 acres and occupies a former, vacant farmstead. No impacts to floodplains or agricultural land are anticipated.

## 4.18 Permits/Certifications

The federal and state permits that will be required for the proposed project are listed in Table 4-19.

Table 4-19. State and Federal Permits Required for Construction of the Project

Permit	Regulation	Agency
Section 404	Section 404, Clean Water Act	USACE
Section 401 Water Quality Certification	Section 401, Clean Water Act	IEPA
Section 402 NPDES Construction Permit	NPDES	IEPA
Regulation of Public Waters	Rivers, Lakes, and Streams Act	IDNR

Source: Harding ESE, 2001.

The main objective of the CWA as amended in 1972 U.S.C. Title 33§1251 *et seq.*, is to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” Section 404 of the CWA regulates the discharge of dredged material or placement of fill material in “waters of the United States” including wetlands. Section 404 is administered by the USACE and USEPA. The USACE has the sole authority to issue these permits while the USEPA reviews the permits issued and has the authority to overrule the USACE decision. To comply with the CWA, a Section 404 permit is required from the USACE for the proposed project.

On May 1, 1992, the Department of Transportation, USEPA, and the Department of the Army adopted the document, “Applying the Section 404 Permit Process to Federal-Aid Highway Projects.” This agreement allows for the Section 404 regulatory process and NEPA review of transportation projects to proceed concurrently. This DEIS is considered by the USACE as documentation for the Section 404 permit application.

In compliance with Section 404(b) of the CWA and Executive Order 11990, extensive efforts were made to avoid and minimize impacts to wetlands to the extent practicable during the alternative development and evaluation process. Coordination with appropriate agencies, including the USACE and IDNR, involved two NEPA/404 merger meetings on September 29, 1997 and September 25, 1998 (see Section 7.2).

The preferred alternative will potentially affect five wetlands comprising a total wetland impact of 0.17 ha (0.42 ac). Wetland impacts and mitigation measures are described in detail in Sections 4.11 and 4.14.

Section 401 of the CWA requires the state to certify that the activity complies with the state’s water quality requirements (see Section 4.9, Water Quality/Resources). A Section 401 water quality certification will be required from the IEPA for the proposed project in conjunction with the Section

404 permit. The IEPA must approve the water quality certification as a condition for issuance of the Section 404 permit.

Section 402 of the CWA establishes the NPDES program. The 1987 amendments to the CWA added Section 402(p) which established the framework for regulating municipal and industrial storm water discharges under the NPDES program. Under final regulations published by the USEPA in 1990, an NPDES permit is required for construction activities which encompass 2 ha (5 ac) or more of surface vegetation. A Section 402 NPDES construction permit will be required for the proposed project from the IEPA (see Section 4.9, Water Quality/Resources).

A Regulation of Public Waters permit is required for the encroachment on any public body of water as authorized by the Rivers, Lakes, and Streams Act (615 ILCS 5).

The IDNR Office of Water Resources requires state permits for activities involving construction in floodways. Since the preferred alternative involves floodplains and there are no mapped floodways within the project corridor, the proposed project should be submitted to IDNR-OWR for review to determine if a construction in floodways of rivers, lakes, and streams permit will be required for construction.